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## LIFE-HISTORY OF *XYLINA BETHUNEI*, G. & R.

BY HENRY H. LYMAN, MONTREAL.

On the evening of 17th of April, 1898, a ♀ of this species entered my room, and was bottled and not looked at again until the morning of the 19th, when it was found that the cyanide in the bottle was exhausted and that the moth was still alive and had laid a considerable number of eggs. The eggs were distributed through the cotton wool at the bottom of the bottle, and this had to be carefully pulled to pieces thread by thread to secure the eggs.

The following description was taken :

Egg.—Somewhat of gumdrop shape, .60 mm. in diameter, wider than high. Many low ribs rising from the base, the whole surface pitted with rather large depressions having the appearance near the apex of short transverse striæ. Colour when laid, creamy with a tinge of green, soon turning whitish and then soon showing a mottling of brownish red. Later they turned darker, but the mottling remained; hatching 1st and 2nd May. Egg period about 14 days.

Young larva.—Stage I: Length, at rest, 1.42 mm.; in motion, 1.70 mm. Head large, considerably exceeding the 2nd segment, lower part projecting forward. Colour creamy white, but with a darker interior shade beginning at the 3rd segment and extending about two-thirds to anal end, but darker and more marked on the anterior segments. Setæ long, concolorous, as are also the feet and claspers.

The larvæ were offered wild cherry, red-oak bud, hawthorn, silver maple, white birch, willow, plantain, ash, apple. They ate several of the foods offered, but preferred cherry, maple or apple; hawthorn, birch and plantain were not touched.

By the 5th May the general colour was a pale green, the interior shade being dark green, though some did not show the darker interior shade, being uniformly pale green.

Passing 1st moult 7th May; described 9th May.

After 1st moult.—Stage II: Length 6 mm. Head pale greenish with a few white hairs, ocelli black. Body pale green, dark green interiorly, with a whitish subdorsal line, and a similar subspiracular line. Warts whitish.

By the 12th some had passed 2nd moult.

After 2nd moult.—Stage III: Length 8.60–9.40 mm. Head pale horn colour. Body green, darker, especially interiorly, above, yellowish green below. There is now a very broken dorsal line of short white dashes. The warts are conspicuous, being of a shiny white, like glazed china. Setæ short and whitish; spiracles very inconspicuous. These larvæ are sometimes restless, but do not tend to stray from the food-plant. They constantly spin threads, so that when picked up with a camel's-hair pencil they are sometimes pulled back by the thread.

While under observation one began to clear away the frass from the maple leaf it was on, picking the pieces up with its jaws and throwing them aside. One mass so thrown consisted of six or more pellets stuck together.

By the 15th nearly all had passed the 3rd moult.

After 3rd moult.—Stage IV: Length, at rest, 12 mm.; in motion, 14.5 mm. Very evenly cylindrical, but with a slight fullness about the 12th segment. Head very pale green with a few whitish hairs, mouth-parts whitish, ocelli rather inconspicuous. Body green with yellowish shades, especially at the segmental folds. Warts as before.

The white lines are the same as before, but the subspiracular fold is strongly marked and is yellowish white. There is an indication by white dots of another line between the subspiracular fold and subdorsal stripe. The spiracles are small and very inconspicuous. Feet and claspers pale greenish.

Passing 4th moult 17th May.

After 4th moult.—Stage V: Length, at rest, 15.6 mm. Head, 2nd and 13th segments, light green, rest of body yellowish green. Warts and stripes as before, white. Setæ pale yellowish, subspiracular fold yellowish white, feet and claspers light green.

On 22nd nine out of fourteen in one jar were found to have passed the 5th moult, and the appearance of the larva is now entirely changed.

After 5th moult.—Stage VI: Length, at rest, 24 mm.; in motion, 28 mm.

Head pale greenish horn colour mottled with blackish green. Body

greenish gray, mottled on part above the subspiracular fold with velvety black. Top of the second segment almost solidly black, with a thin pale horn colour dorsal line, the warts very small and similar in colour to dorsal line. This black patch is bordered on the sides by a whitish line, and below is a clear greenish wedge-shape space, wider anteriorly; below this it is mottled in black to the subspiracular band. Dorsal stripe from 3rd segment to 13th yellow, shaded with orange. Warts distinct, white like glazed porcelain. Setæ rather weak, pale in colour. On 8th to 11th segments there are two small white dots like warts in advance of wart i., at about same distance from i. as ii. is. These spots are a little further from the dorsal line than i., but not quite as far as ii. Subdorsal stripe broken up into a line of spots, subspiracular fold broad, cream colour; just above this a black band of varying width, widest at the spiracles, which show upon it as white ovals; between this and the subdorsal stripe there is a series of white dots.

The black mottling tends to be grouped about the warts and other white dots.

The top of the 12th segment is slightly swollen. Below the subspiracular fold the body is pale green with only a powdering of black atoms about the warts v. and vi.

Feet and claspers pale green.

On 23rd May I noticed that there were only 13 larvæ in the jar where there had been 14, and it is possible that one had been eaten, though they had never been short of food. In the other jar cannibalism, which is a characteristic of this group, had evidently been practised, as evidenced by the remaining anal extremity of a larva which had apparently been devoured when in process of moulting.

I therefore separated them into four jars so that they should have more room. One larva was of a much grayer tone than the average, being wanting in the greenish shade. The larvæ were mature about the end of May, the colour as usual changing just before the pupation, the greenish shade of the upper area giving place to a pinkish tinge.

The length of the mature larva is 31-32 mm. The larva enters the ground and makes a close cocoon of grayish silk and pellets of earth. The pupa is of the usual noctuid type. The moths began to appear about the 29th July, and continued to emerge for a week or ten days. This is very much earlier than they would have emerged had they been subjected to the vicissitudes of their natural life out of doors.



NEW JASSIDÆ FROM THE ROCKY MOUNTAIN AND  
PACIFIC REGION.

BY E. D. BALL, FORT COLLINS, COLO.

The following species, with a few exceptions, were taken by Mr. E. P. Van Duzee and the author while on a very interesting and successful trip through southern and western Colorado during the latter part of July, 1900. These species are all strictly south-western in distribution as far as known, and most of them were found feeding on one or another of the peculiar plants of that region. While collecting in the valley of the Grand River, a number of species of Homoptera were taken, hitherto only known from the Californian region, and it is very probable that in turn several of these species, which were taken along with them, will, eventually, be found in California.

## HECALUS BRACTEATUS, n. sp.

Resembling *brunneus*, the elytra shorter in the female, longer in the male. Head longer and thinner. Female, pale yellow. Male, milk-white with fuscous lines. Length, ♀ 7 mm., ♂ 5 mm. Width, ♀ 1.5 mm., ♂ 1.25 mm.

Female.—Vertex long, with a foliaceous margin, disc transversely convex, the lateral margins but slightly narrowed for half the length, then forming a parabolic curve. Length and width in front of eyes about equal, two and one-fourth times the length of the pronotum. Elytra brachypterous, covering the first abdominal segment, as long as the vertex, their apices rounding. Venation reduced, a broad margin outside of the first section, which is once forked, no apical and rarely more than one anteapical cell present.

Male.—Vertex roundly triangular, its basal width one-third greater than its length, slightly longer than pronotum, margin not foliaceous. Elytra long and narrow, much longer than abdomen, venation distinct, somewhat irregular, usually the second cross nervure present, forming three anteapical cells, of which the second is much the longer.

Colour: female pale yellow or straw colour, the elytra with a few fuscous dots next the nervures; abdomen with a pair of olive stripes on each side, these stripes margined with dotted fuscous lines, a similar median line. Sometimes the olive stripes disappear, leaving the abdomen with nine dotted fuscous lines. Male milky white, sometimes with five olive stripes, dotted with fuscous, on vertex and pronotum. Elytra

with the milk-white nervures margined with fuscous dots. Upper half of the face fuscous.

Genitalia : ultimate ventral segment of the female as long as the penultimate, the posterior margin roundly emarginate, with a broad blunt tooth. Male, valve triangular, plates triangular, the margins slightly concave, fringed with stout spines ; plates about three times the length of the valve.

Described from numerous specimens from Rocky Ford, Colo. This species is apparently intermediate in structure between this genus and *Parabolocratus*. The females are all brachypterous and have the elongate head of a *Hecalus*, while the males are long-winged and have the short vertex of *Parabolocratus*.

ATHYSANUS SYMPHORICARPÆ, n. sp.

Form and size of *instabilis*, lighter coloured, resembling *striatulus*, but larger and lighter testaceous. Length, 4.5 mm.; width, 1 mm.

Vertex twice wider than long, half longer at apex than against eye, rounding to the broad almost parallel margined front, clypeus much narrower than apex of front, parallel margined. Elytra stout, longer than body as in *instabilis*, the central anteapical cell long, narrowed in the middle, more than half its length beyond the apex of clavus.

Colour : vertex and face yellowish testaceous, lines on front and irrorations on vertex fusco-testaceous. Pronotum and scutellum paler, with a slightly olive tinge. Elytra pale brownish or olive testaceous, subhyaline, the nervures light. Legs and all below pale orange testaceous.

Genitalia : ultimate ventral segment of the female little longer than the penultimate, the lateral margins narrowing, the lateral angles a little produced, triangular, between these the posterior margin is slightly rounding, shining black. One specimen has an acutely angular notch either side the middle, one-third the distance to the margin, leaving a broad central tooth ; one has only one notch ; and two, probably not having copulated, have none.

Described from four females from Ridgeway, Colo.

ATHYSANUS VARUS, n. sp.

Form and colour of *alpinus* and *extrusus*, but with a narrower body and longer elytra. Male darker, resembling *plutonius* female. Length, ♀ 5 mm., ♂ 4.25 mm. Width, ♀ 1.5 mm., ♂ a little over 1 mm.

Vertex roundly triangular, twice wider than long, two-thirds the length of the pronotum, disc convex, rounding to front, apex bluntly conical; front broad and flat, width between antennæ a little less than three-fourth its length. Elytra long, the outer margins almost parallel, their apices very broadly rounding. Venation strong, often accessory cross nervures along clavus and between sectors of corium; central anteapical cell very long, the posterior end angularly enlarged.

Colour: ground colour a dirty straw-yellow; vertex with a transverse band just back of the ocelli, the ends of which do not reach the eye, but curve forward to the front; another interrupted band half way between this and the posterior margin and two dashes curving away from the apex and paralleling the other bands, black. Elytra with the nervures white, the cells mostly filled with dark fuscous, omitting a transverse, hyaline, band across the juncture of apical and anteapical cells, a large milk-white patch on the cross nervures between the sectors, a smaller one at the apex of each claval nervure and sometimes another next to the claval suture. Face, dirty yellow arcs on front, especially on upper half; sutures, spots around the antennal sockets and the disc of the clypeus, fuscous. Male much darker than female, lower part of face and below black.

Genitalia: ultimate ventral segment of the female one-half longer than penultimate, posterior margin nearly truncate, the median third roundly produced; usually the segment is curved over the ovipositor so that it appears emarginate, with a quite pronounced median lobe; male valve less than half as long as its breadth at base, the apex rounding; plates no wider than the valve, slightly concavely triangular, the apex acute, two and one-half times the length of the valve, clothed with stout white spines.

Described from ten females and one male from Fort Collins, Colo.

Readily distinguished from any other American species by the genitalia and venation. There is a group of about six European species that possess the same milk-white elytral markings, of which *distinguendus* and *Schenkii* are similar in form, but none of them in venation and genital characters.

THAMNOTETTIX GRAECULA, n. sp.

Form of *flavocapitata* nearly, but stouter; as large as *Coquilletti*, which it somewhat resembles in colour. Length, ♀ 5.5 mm., ♂ 5 mm.

Vertex roundly angular, the apex conical, scarcely two-thirds as long as its breadth at base, half longer than against eye; disc convex, rounding to the front except at apex; front broad, rather flat; clypeus broadest just before the rounding apex. Pronotum a little over half longer than vertex; elytra rather stout. Venation peculiar, resembling *longula*, except that the outer anteapical cell is pointed and petiolate anteriorly and the outer fork of first sector is very faint. Male smaller and with a blunter vertex.

Colour: pale yellowish olive; the female has two large spots within the basal angle and two smaller ones on the disc of the scutellum and the cross nervures between the sectors brown. Elytra with slight reddish cast. The males have no marking on scutellum, the elytra are distinctly embrowned, especially along the claval and apical areas. In both sexes there are a number of oval subhyaline areas. In the males there are three approximate pairs along the sutural margin.

Genitalia: ultimate ventral segment of female half longer than penultimate, the lateral angle rounding, the posterior margin triangularly emarginate from the lateral angles half way to the base; from the bottom arises a strap-shaped tooth equalling the lateral angles; male valve broadly evenly rounding. The plates, concavely, triangularly acuminate, about twice the length of the valve.

Described from one female and three males from Rifle, Durango and Colorado Springs, Colo.

SCAPHOIDEUS BLANDUS, n. sp.

Form and general appearance of *jucundus*, smaller and paler, lacking the reddish tinge of that species. Costal margin of elytra with numerous regular cells. Length, 5 mm.; width, 1.10 mm.

Vertex right-angled back to the eyes, which round off, not quite as long as its basal width, disc flat, margins straight, vertex and face forming an acute angle; front, margins straight, clypeus very slightly broadened below. Pronotum as long as vertex, more than half of its length within the curve of the vertex. Elytra, claval veins but slightly curved apically, usually a cross nervure from outer one to suture and often several irregular ones between the veins, outer anteapical cell usually with one cross nervure to the costa, sometimes several, costal margin with numerous, indistinct, almost equidistant nervures which are perpendicular to the margin.

Colour : almost uniform dull yellow, the anterior margin of vertex pale, faintly margined with brown. Elytra with oval light spots, which are milky on clavus and subhyaline white on corium ; the three pairs along the sutural margin are very regular. Below pale yellow.

Genitalia : ultimate ventral segment of female twice wider than long, posterior margin rounding, variably trisinate either side of a narrow median incision ; the inner pair of lobes usually largest, lateral angles rounding, disc with a dark spot, pygofer short, strongly inflated in the middle. Male valve small, bluntly triangular ; plates rather broad, the basal half rounding, apical half triangularly narrowing to the blunt tips, two and one-half times longer than valve, the flat lateral margins separated from the convex disc by a dark line.

Described from numerous specimens from Rifle, Ridgway, Dolores and Durango, Colo. The quadrangular cells along the costa will readily separate this from any described form.

SCAPHOIDEUS FUMIDUS, n. sp.

Resembling *blandus* in form and size. Colour rich testaceous brown, the margins of vertex and pronotum and apex of elytra white. Length, 5 mm.; width, 1.5 mm.

Vertex right-angled, slightly shorter than its basal width, lateral margins slightly rounding, disc flat or slightly transversely depressed on the middle ; outline of face as seen from the side straight, front rapidly widening above antennal pits, regularly narrowing below ; clypeus short, constricted in the middle, genæ broadly margining the loræ below. Pronotum slightly longer than vertex. Elytra rather long and narrow behind ; outer claval vein nearly straight, venation obscured by the deep colour, except in the apical cells, nodal vein arising from beyond the middle of the outer anteapical cell.

Colour : rich testaceous brown, vertex lighter, the lateral margins of vertex and pronotum and the costal margin of elytra at base creamy white, the apex of corium from just beyond the clavus and including all the apical cells and the apices of the two outer anteapical cells, subhyaline white. Sometimes a few oval white spots in the testaceous portion of elytra. Face and below pale creamy yellow.

Genitalia : ultimate ventral segment of female with a broad, triangular, median notch, either side of which there is a broad rounding lobe which slopes away to a small triangular lobe next the lateral angle ;

male valve small, not as long as the ultimate segment, roundly triangular ; plates narrow, long, triangular, their apices acute.

Described from ten specimens from Rifle, Dolores and Durango, Colo. The white margins anteriorly and the sharply defined tip to the elytra against the rich ground colour render this an easily recognized species. The general shape and colour suggest the genus *Platymetopius*, but the shorter vertex and the face characters place it with *Scaphoideus*. Such species as this weaken generic characters and at the same time help us in that they show affinities.

PHLEPSIUS VANDUZEI, n. sp.

Form and general appearance of *cinereus*, but much larger ; stouter built than even *nebulosus*; grayish cinereous, with a trilobate commissural line. Length, 8 mm. ; width, 2.75 mm.

Vertex very bluntly conical, one-fourth longer on middle than against eye, three-fifths the length of the pronotum, no visible line between it and front ; front not quite as long as its basal width, the apex one-third the width at base ; clypeus long, wedge-shaped, broadest below ; pronotum two and one-third times wider than long. Elytra broad, longer than the body, compressed before the flaring apex ; claval veins sometimes tied across.

Colour : dirty white, sometimes a pale yellow wash on vertex and pronotum. Vertex with a distinct round black spot on the middle of either side at the base, a few irregular dark vermiculations anteriorly, omitting a broad median line which extends down the front ; numerous short arcs on front, a spot on clypeus, a pair on loræ, another pair just under eyes, fuscous. Pronotum and scutellum with very faint markings, elytral veins yellow and fuscous ; between them the membrane is very finely, sparsely, and somewhat irregularly vermiculate, omitting a broad commissural line, which is divided into three lobes by the apices of the claval nerves. The outer apical and two costal veins often very much infuscated, the spaces between clear.

Genitalia : ultimate ventral segment of the female appearing only as a narrow strip along the pleura on either side ; in its place is a thin membrane shaped almost like the segment in *apertus*, with its rectangular median excavation, and showing beyond its posterior margin the rounded apices of the plates, near the middle line, and the rounding lobes of a second membrane near the lateral angles ; male valve triangular, the apex bluntly roundly produced ; plates broad at base, roundly triangular,

their apices produced, compressed, slightly divergent; disc, convex, inflated, a few appressed hairs along the margin; plates equalling the pygofers, nearly five times the length of the valve.

Described from a pair taken at Rifle, Colo., by Mr. E. P. Van Duzee, and two females taken at Grand Junction the next day by the author. This large species is strikingly distinct in form, colour and genitalia, and it gives me great pleasure to name it after the man who has in the past so carefully worked out this genus for us, and whose energy and "Kansas umbrella" taken together did so much to make this mountain trip both pleasurable and profitable to the author.

PHLEPSIUS EXTREMUS, n. sp.

Very small, oval, depressed, with a flat, thick margined vertex; resembling *decorus* and *areolatus* in general appearance, but much smaller. Smaller than *ovatus*, head as wide as the pronotum. Length, ♀ 4.5 mm., ♂ 4 mm.; width, 1.5 mm.

Vertex flat, over three-fourths the length of the pronotum, over half longer on middle than at eye, not quite twice wider than long, the anterior margin thick, angle with front acute; front broad, nearly flat, longer than wide. Elytra short, oval, claval veins distinct.

Colour: milky white, heavily irrorate with dark fuscous so that the general colour is dark without the reddish or brownish tinge so common in this genus; vertex very heavily irrorate, omitting a narrow margin and median line. Pronotum with large olive brown spots along the anterior margin as in *decorus* and *areolatus*. Elytra with numerous supernumerary veins and reticulations, irrorations almost obsolete except in a few dark spots around the apex and along the costa, one or two near the apex of clavus and two very distinct ones between the sectors of the corium. Front very heavily irrorate with brownish fuscous, rest of face and legs lighter.

Genitalia: ultimate ventral segment of the female twice the length of the penultimate, the lateral angles broadly, roundly produced, between these the margin is roundly emarginate with minute angular teeth at the bottom. In the natural position of the segment it appears to be angularly emarginate almost from the lateral margins; male valve very small, broad and short, about one-fourth the length of the ultimate segment; plates triangular, their apices hardly acute, a little longer than the ultimate segment.

Described from two males and two females, three from Rifle and one

from Durango, Colo. One Rifle specimen from Mr. Van Duzee. This is as short as *albidus*, but much broader, and is quite distinct structurally from any other species with a flat vertex and a broad head.

PHLEPSIUS DENUDATUS, n. sp.

Resembling *ovatus*, but broader and shorter. Even lighter coloured than *albidus*. Head broader than thorax. Form stout. Length, 4 mm.; width, 2 mm.

Vertex blunt, rounding, twice wider than long; front broad, about one-fifth longer than wide, clypeus enlarged at apex. Pronotum very short, but one-third longer than vertex, lateral margin scarcely apparent. Elytra short, broad, flaring behind, giving the insect a square-set appearance. Venation very indistinct, somewhat variable.

Colour: milky white, very sparsely spotted and irrorate with fuscous. Vertex with a pair of round spots just inside the eyes; within and back of these a pair of oblique dashes, fuscous. Pronotum with a pair of fuscous spots in a line with the inner margin of the eye on either side, sometimes a row of fuscous markings inside of these. Scutellum with a pair of triangular spots within the basal angles and a smaller pair of round ones on the disc. Elytra with three pairs of equidistant approximate spots along the suture, the middle pair the largest, and a number of spots along the costa, black. Sometimes these are absent except the large pair on the suture, and a spot opposite the anteapical cells on either costa. Veins pale yellow, indistinct. Face and all below dirty white.

Genitalia: ultimate ventral segment of the female about twice as long as the penultimate, the lateral angles feebly, angularly produced, the margin between them very slightly rounding, with a small semicircular median emargination; male valve small, triangular; plates broad, triangular, as long as the ultimate segment.

Described from numerous specimens from Grand Junction, Colo. (V. D. and the author.) This is another of the "white" Phlepsids, which seems to be strictly south-western in distribution. In structure it resembles *Vanduzeei*, but in size and colour it is very different.

(To be continued.)

I desire to acknowledge the Society's indebtedness for a perfect pair of *Plusia aeroides*, from Mr. C. H. Young, Hurdman's Bridge, through Dr. Fletcher. A very rare species in this district.

J. ALSTON MOFFAT, Curator.



## REVISION OF THE GENUS CATOCALA.

BY G. H. FRENCH, CARBONDALE, ILL.

On page 191, Vol. XXXII., of the CANADIAN ENTOMOLOGIST (1900), Dr. Grote describes a new species of Catocala from Texas, *C. moderna*, related to *C. viduata*. If we place this as No. 7 in our list of the former article, and push the rest one number forward, it will bring *C. relictæ* No. 21 instead of No. 20. Following this with the "red wing" species, I would arrange this group as follows :

- |                          |                          |
|--------------------------|--------------------------|
| 22. Cara, Guenee.        | 45. Hermia, Hy. Edw.     |
| var. Sylvia, Hy. Edw.    | 46. Cassandra, Hy. Edw.  |
| var. Carissima, Hulst.   | 47. Briseis, Edw.        |
| 23. Amatrix, Hubner.     | 48. Faustina, Strecker.  |
| var. Nurus, Walker.      | var. Zilla, Strecker.    |
| 24. Concumbens, Walker.  | var. Verecunda, Hulst.   |
| var. Diana, Hy. Edw.     | var. Allusa, Hulst.      |
| var. Hillii, Grote.      | 49. Irene, Behr.         |
| 25. Californica, Edw.    | var. Virgilia, Hy. Edw.  |
| var. Perdita, Hy. Edw.   | var. Volumnia, Hy. Edw.  |
| var. Cleopatra, Hy. Edw. | var. Valeria, Hy. Edw.   |
| 26. Hippolyta, Hy. Edw.  | 50. Parta, Guenée.       |
| 27. Arizonae, Grote.     | var. Perplexa, Strecker. |
| 28. Luciana, Hy. Edw.    | var. Petulans, Hulst.    |
| <i>Nebraska</i> , Dodge. | 51. Coccinata, Grote.    |
| var. Somnus, Dodge.      | Sinuosa, Grote.          |
| 29. Marmorata, Edw.      | var. Circe, Strecker.    |
| 30. Babayaga, Strecker.  | 52. Aholibah, Strecker.  |
| 31. Aspasia, Strecker.   | 53. Violenta, Hy. Edw.   |
| var. Sara, French.       | 54. Verilliana, Grote.   |
| 32. Juntura, Walker.     | var. Ophelia, Hy. Edw.   |
| var. Walshii, Edw.       | var. Votiva, Hulst.      |
| 33. Unijuga, Walker.     | 55. Ultronia, Hubner.    |
| 34. Beaniana, Grote.     | var. Celia, Hy. Edw.     |
| 35. Augusta, Hy. Edw.    | var. Mopsa, Hy. Edw.     |
| 36. Rosalinda, Hy. Edw.  | var. Adriana, Hy. Edw.   |
| 37. Pura, Hulst.         | var. Herodias, Strecker. |
| 38. Semirelictæ, Grote.  | 56. Iliæ, Cramer.        |
| 39. Meskei, Grote.       | var. Zoe, Behr.          |
| 40. Stretchii, Behr.     | var. Uxor, Guenée.       |
| 41. Portia, Hy. Edw.     | var. Osculata, Hulst.    |
| 42. Mariana, Hy. Edw.    | 57. Innubens, Guenée.    |
| var. Francesca, Hy. Edw. | var. Flavidalis, Grote.  |
| 43. Jessica, Hy. Edw.    | var. Hinda, French.      |
| 44. Grotiana, Hy. Edw.   | var. Scintillans, Grote. |

The three forms, *Babayaga*, *Aspasia* and *Walshii*, have been more or less confused. While at a casual glance they are very close, still I have no trouble in separating them. The first I have seen from Texas and Arizona. The fore wings have a brownish velvety appearance, the s. t. line not lighter than inside the t. p. line, the t. p. and t. a. lines dark brown with a mesian transverse and s. t. brown shade. The mesian band of the hind wings is very narrow, only slightly expanded in the middle, abruptly bent at the posterior and not reaching the internal margin.

*Aspasia* has the ground colour of a slight bluish tinge, the lines of a deeper brown, almost black, the mesian and s. t. shades more distinct brown, the s. t. line almost or quite concolorous with the ground colour. The mesian band of the hind wings is from a quarter to a third wider than in *Babayaga*, and often nearly reaches the internal margin by a shade.

In *Walshii* the ground colour of the fore wings is much as in *Aspasia*, but the s. t. line is white or whitish and the shades are less brown, and the mesian band of the hind wings is nearly twice as wide as in *Babayaga*.

I have seen *Babayaga* from Texas and Arizona; *Aspasia* from Arizona and Colorado; *Walshii* from Arkansas, Missouri and Illinois; and what may be *Junctura* from Arkansas. I have not before me Walker's description, and hence do not know the locality he gives for the specimen he described. If I know the genuine *Junctura* it has more or less white through the middle of the fore wings, as Grote says in one of his descriptions, somewhat simulating *Unijuga*, with the mesian band of the hind wings wider than in either of the first three forms. I have seen such specimens from the East, and one or two from Arkansas in the collection of Mr. T. C. Poling, of Quincy, Ill., approximate the eastern forms. On the strength of this I have put *Walshii* as a variety of *Junctura*.

As to the specific status of these forms I have not much to say. I have taken *Walshii* here in Southern Illinois for more than 20 years, and have never found one intergrading toward what I have called *Junctura*, and hence have not shared Mr. Grote's idea that it was a synonym of *Junctura*, and only place it as a variety for the reason given above. Nor have I seen any intergrading toward *Aspasia* or *Babayaga*. It is possible that these four forms are but one species, but it seems to me better to let them stand till by breeding they are proven to be one.

In another species, *Stretchii*, I found by breeding that there was considerable variation in the colour of the fore wings, but the mesian band

of the hind wings and the main markings of the fore wings were constant. Hence I separate this without hesitation from all other forms.

It is commonly conceded now, I think, that *Nebraska*, Dodge, is a synonym of *Luciana*, Hy. Edw. I have not seen *Portia*, *Jessica* and *Cassandra*, and place them where they have been placed, as I have only descriptions of these species. From my own observation I should be inclined to separate *Circe* from *Coccinata*, as I take only the first form here, but the size given in the descriptions and what I have seen in other collections lead me to think that they are but forms of one species.

#### A NEW CANADIAN TINEID.

BY AUGUST BUSCK, WASHINGTON, D. C.

*Anacamptis lupinella*, n. sp.

*Antennæ* bronzy black with white annulations, slightly serrate, especially towards the tip.

*Labial palpi* long, smooth, recurved; second joint somewhat thickened, with appressed scales, dark ochreous brown; terminal joint longer than second, acicular, dark brownish, with tip black.

*Maxillary palpi* obsolete. *Tongue* stout, scaled.

*Eyes* [in the dry specimen] dark brick red.

*Face* light brown, with dark purple reflexions.

*Head* and *thorax* concolorous with fore wings, purplish black, with a satin lustre and with numerous evenly distributed bluish white scales, only visible under a lens.

Three varieties are before me.

*Fore wings* in some specimens without any markings; in others they have a distinct whitish yellow spot at the beginning of the costal cilia and another similar dorsal spot opposite.

In still other specimens these spots are extended downwards and upwards relatively and meet each other, forming a narrow transverse fascia.

In the two former varieties the fore wings are otherwise uniformly coloured, but in the last moth the outer half of the wing is suffused with irregular longitudinal streaks of light brown.

Presumably all gradations of these types exist.

Under side of fore wing uniformly bluish black, without trace of the fascia or spots.

*Hind wings* a little broader than fore wings, termen not sinuate, black, with strong purple reflexions.

*Venation* typical: Fore wings: 12 veins, 7 and 8 stalked, the others separate. Hind wings: 8 veins, 3 and 4 connate, 6 and 7 connate.

Entire body and legs purplish black.

Alar expanse 14 mm.

*Habitat*.—High Park, Toronto, Canada.

U. S. National Museum, type No. 5351.

Described from three perfect female specimens, reared from *Lupinus perennis* and presented to the National Museum by Dr. J. Fletcher.

The insect is in several respects an interesting one. It belongs to that group of *Anacampsis*, Curtis [*Tachyptilia*, Hein., *Meyrick*], which in coloration suggests strongly the *tanionella* group of the genus *Aproaerema*, Durrant [*Anacampsis*, *Meyrick*].

It is nearest *Anacampsis* (*Gelechia*) *agrimoniella*, Clemens, and has not only the pattern but the leguminous food plant of *Aproaerema*, while having the wing form and venation of *Anacampsis*; indicating in connection with the other species in this group the correlation of the two genera.

Its general habitus suggests very much the genus *Trichotaphe*, Clemens, to which genus I took it to belong, before examining closely the venation.

The insect is one proof of the close relationship between *Anacampsis* and *Trichotaphe*, which in their nearest related forms only differ in the single point: veins 2 and 3 in fore wing being stalked in *Trichotaphe*, while they are separate in *Anacampsis*.

*Anacampsis tristrigella*, Walsingham, described as *Gelechia*, and *Anacampsis levipedella*, Clemens, described as *Strobisia*, belong in this immediate group.

The following description of the full-grown larva is by Dr. James Fletcher, Ottawa:

Larva.—Shape as in many other Tineids, almost cylindrical; head and 2nd segment slightly smaller than rest of body; segments 3 to 5 very little smaller than segments 6 to 12. Length 13 mm., extended 15 mm. Width, segments 6 to 12, 2 mm. wide; segment 2, 1.40 mm., segments 3, 4 and 5, 1.60 mm. Head 1 mm. wide, flattened and rather shorter than wide; horizontal, slightly oblique, shining, bearing a few slender hairs; deeply indented at apex, testaceous, darkened along posterior margin and bearing a black blotch at lower posterior angle of each cheek; ocellar field black; length .90 mm. Thoracic shield large, conspicuous, concolorous with head; width 1.30, depth .50 mm; almost straight in front,

rounded posteriorly. One-third of lower margin edged with black and terminating with a black point at lower anterior angle ; posterior margin swollen and bearing on each side of median line 3 small black piliferous tubercles. There are also 3 others on front margin. Tubercles of body black, bearing slender fawn-coloured hairs, normally placed, consisting of 3 dorsal, 3 substigmatal and 1 ventral series. No. i. anterior, and sub-dorsal, half the size of ii. and iii.; No. ii. posterior, and supralateral ; No. iii. median, immediately above the minute black spiracles, slightly larger than ii.; on segments 7 to end enclosing the spiracles in their lower margins ; No. iv. twice its width from spiracles and immediately below them ; No. v. below and in a line with No. ii.; the tubercles of series No. vi. form a line running from base of thoracic feet to base of anal prolegs ; the tubercles of this series are more than twice longer than high, being merely short black chitinous dashes bearing 2 or 3 bristles, except on segments 5, 6, 11, 12 and 13, where they are dots. Substigmatal series, tubercles iv., v., vi., are all of the same size as ii., larger than i., smaller than iii. Medio-ventral series of very small tubercles, one on each side of every segment, beneath. On segment 2 a large black oval tubercle (No. v.), beneath thoracic shield and anterior to the spiracle, and a tubercle at base of thoracic foot (No. vi.). On segments 3 and 4, tubercle No. i. is wanting, and as usual Nos. ii., iii. and v. are arranged in a curved line across the segments ; No. v. anterior to the other two ; vi. is at base of thoracic foot, and iv. immediately above it, but higher up than v.

General colour of larva dark olive green above, paler below, dorsal vessel showing as a dark stripe. Thoracic feet testaceous, blackened at tips, with a narrow chitinous black fold in front and another behind at the base of each. Prolegs concolorous with body ; claspers rusty.

Cocoon, slight, among the leaves. Pupa chestnut brown, length 6.50 mm. by 1.75 mm. at widest part. Thorax and abdomen bearing a few slender bristles, which are most numerous towards the cremastral end. Cremastral hooks long and slender. Whole body covered with a very short fulvous velvety pile.

These larvæ were found in considerable numbers among leaves of *Lupinus perennis* kindly sent from High Park, Toronto, by Mr. Allan Kinghorn. Each larva made a tent by tying two or three of the leaflets loosely together. They were almost full-grown when received, and the first pupated on the 10th of June. Pupal period about eight days. Eight moths were reared, all females. There was considerable variation as to markings, the transverse fascia being obliterated in some specimens, but more or less apparent in most.

## CYPHODERRIS MONSTROSA.

BY SAMUEL H. SCUDDER, CAMBRIDGE, MASS.

From time to time during the last two or three years, Dr. James Fletcher has sent me specimens of a curious Locustarian taken at Banff, Alberta, by Mr. N. B. Sanson, curator of the Government museum in the National Park at that place. The specimens were all wingless and apparently immature females, but quite unlike anything known from that region. A study of their structure showed that they belonged to the Stenopelmatini and were most nearly allied to the genus *Cyphoderris*. Now, *Cyphoderris*, though described by Uhler thirty-six years ago, is a rare creature and was on record from only two localities, Oregon and Wind River, Wyo., and only males had hitherto been taken. The probability that these immature and wingless females belonged with the winged males appeared to me, however, so great that in my recent catalogue of North American Orthoptera I recorded the species given in the title above as found in Alberta.

Nevertheless, I had misgivings and asked Dr. Fletcher to obtain mature specimens to make sure. By his urgency, Mr. Sanson has forwarded separately this last autumn two mature females *alive*, the first of which Mr. Fletcher sent to me. These were in no respect different from the immature specimens except in size and in slight traces of wing-pads beneath the pronotal shield; while in the appearance of the pronotum they differed so greatly from the male of *Cyphoderris* that I was as much at a loss as ever; for the male *Cyphoderris* has the posterior half of the pronotum so hunched and enlarged as to be almost a half broader posteriorly than anteriorly; this is to give room for the coarse and bellied tegmina, which it overhangs, which are considerably longer than the pronotum, and nearly the whole of whose dorsal surface is made up of a coarse stridulating organ. But the females sent had a pronotum of nearly uniform diameter and practically no wings. Only by securing a male from the same region or females from Oregon or Wyoming could the question really be decided whether these represented closely-related genera or the same or nearly-allied species. The matter has just been definitely settled by the receipt of a male from Banff, kindly sent by Mr. Sanson from his collection, which cannot be separated from the Oregon types in my possession. Mr. Sanson responded generously to the

demands upon him; he obtained his specimens under logs and stones where he had placed old bones as a bait. They appear to be scarce, and he has so far secured but one male.

The occurrence of such a form so far north is of particular interest, for *Cyphoderris* belongs to a group of Anostostomata (a subdivision of Stenopelmadini) which is purely American, but mainly tropical, its northernmost allies being found in Mexico. Moreover, the Old World species and genera of Anostostomata are from the southern hemisphere exclusively.

Both Mr. Fletcher and I kept our females alive for nearly a month, feeding them chiefly on apples, of which they partook rather sparingly. They were very sluggish, as seemed fit for such heavy-bodied creatures, and could scarcely jump at all, not above half an inch at a time, and were more active by night than by day. Whether eggs are laid in the autumn or spring is uncertain; the former would seem probable from their dying in captivity before November, the latter from the fact that when captured in September the thermometer stood at 19° F. I gave my specimen no water, but Mr. Fletcher gave his some from a brush, which she drank, but, he writes me, "if I push the brush too assiduously she turns over on her back and bites and kicks savagely and then lies perfectly still." After death the abdomen contracts greatly.

Taking advantage of possessing a living specimen, I took notes of the colouring, etc., from which the following description of the female is taken:

Head above the antennæ bronze black, longitudinally marked with pallid luteous; genæ and face below the antennæ pale lilac, excepting the clypeus and labrum, which are pale lemon yellow, the whole marked with blackish; palpi pallid, feebly infuscated, especially the maxillary pair, in stripes and apical marginings, the extreme apex of apical joint pallid; basal joint of antennæ pallid, with broad basal and narrow subapical fuscous annuli, the remaining joints bronze black; eyes castaneous.

Pronotum subcylindrical, subequal, very feebly constricted just in advance of the middle, dull luteous with a nacreous sheen, the posterior edge and lower margins of the lateral lobes flavous or flavescent, the whole heavily and massively marked, especially in the constricted region, with very dark glistening bronze green, the whole surface, whether dark

or light, sprinkled very sparsely and very inconspicuously with luteous dots. Sternal parts of thorax luteous, more or less infuscated. Tegmina reduced to minute membranous testaceous pads, concealed beneath the pronotum. Coxæ and trochanters blackish fuscous; femora luteo-testaceous, the whole apex and a broad longitudinal median band on the outer side subpiceous; tibiæ pallid luteous, with a piceous stripe following the upper lateral spinigerous margins, heavier in basal than in apical half; the fore pair with one spine above on inner margin, besides an apical one, none on the outer margin, below with two or three spines on each side, besides the apical one; the middle pair with no spines below, two or three on either side above, besides the apical one; and the hind pair with no spines below and six or seven on either side above, besides the apical one; the spines pallid or luteous tipped with black, excepting the apical spines, which are almost wholly fuscous; tarsi very pale red beneath, pallid above, edged apically with fuscous.

Abdomen very plump, deeper than broad, having above the same colours as the pronotum, the luteous nacre forming the base, and the bronze green, somewhat embrowned, confined to the apical margins of the segments in an irregular edging; sides of abdomen between the dorsal and ventral scutes pale brown, sparsely sprinkled with pallid dots, the spiracles glistening bronze.

Length of body, 21 mm.; pronotum, 8 mm.; breadth of same, 7 mm.; length of antennæ, 25 mm.; hind femora, 11 mm.; hind tibiæ, 10.5 mm.; hind tarsi, 7 mm.

[Mr. Sanson states that these insects are by no means common at Banff. The first specimen he acquired was found in the basement of the Canadian Pacific Hotel, by Miss Adams, of Winnipeg; Mr. W. C. McCalla, of St. Catharines, Ont., took two immature specimens among the fir boughs used as a bed in his camp. One specimen was given to Dr. White, of Banff, by Mr. George Paris, of the same place. Mr. Sanson caught two mature females, one by placing some biscuits and brown sugar under a sheet of botanical drying felt near one of the summer residences off Tunnel Mountain Rd., near the place where the perfect male referred to above was taken; the second was found under a log where a bone had been placed as a bait; and the last specimen found was brought to him by a member of a camping party, who had it for a few days and brought it in alive. In all, seven specimens have been secured.—ED.]



## NOTES ON SOME ONTARIO ACRIDIIDÆ.—PART IV.

BY E. M. WALKER, TORONTO.

(Continued from Vol. XXXI., page 36.)

- 16a *Spharagemon collare*, Scudd., race *Wyomingianum*, Thomas.  
*Oedipoda Wyomingianum*, Thom. Ann. Rep. U. S. Geol. Surv.  
 Terr., V. 462 (1872).  
*Spharagemon Wyomingianum*, Scudd. Proc. Boston Soc. Nat.  
 Hist., XVII., 475 (1875).  
*Spharagemon oculatum*, Morse. Proc. Boston Soc. Nat. Hist.,  
 XXVI., 232 (1894).  
*Spharagemon collare*, race *Wyomingianum*, Morse. Psyche, VII.,  
 298 (1895).

In September, 1899, I found this species fairly plentiful on sand dunes, in Rondeau Provincial Park, Kent Co., on the shore of Lake Erie. The sand dunes occupy a considerable area there, and in some places near the lake shore are thinly wooded with red cedar (*Juniperus virginianus*). It is here that I found this locust in the largest numbers, though they were also to be found further away from the shore in open places in oak woods; only, however, where the soil was sandy. In another part of the Park, where the trees were mostly pines, *S. bolli*, Scudd. was common, but I never found the two species together. In the juniper groves near the beach, *S. Wyomingianum* was in company with *Trimerotropis maritima* which occurred in great numbers, and was found also, and still more abundantly, on the open beach, where *S. Wyomingianum* did not venture.

The hind tibiæ of my specimens vary from pale yellow to orange, none being decidedly red. They are dated Sept. 14 and 15, 1899.

This is the first notice of this species in Ontario, and of the race *Wyomingianum* in Canada. I have found the typical *collare* common from Manitoba to British Columbia.

*Encoptolophus sordidus*, Burm.—Until the last two or three years this species was quite rare in Toronto, which was about its northern limit in that part of Ontario. In the fall of 1897 I saw quite a number in some of the dry, sandy hillsides in High Park, and in 1898 they were much more numerous, and were even seen about the city, in open grassy places. This summer they were common everywhere, their crackling stridulation being heard in almost every field. They have now extended to Lake Simcoe, if not further, for I found them in small numbers, this summer, at De Grassi Point. The species seems to be spreading northward.

21a. *Podisma glacialis*, Scudder.

*Pezotettix glacialis*, Scudd. Boston Journ. Nat. Hist., VII., 630-631 (1863).

*Pezotettix borealis*, Glov. (nec. Scudd.). Ill. N. A. Ent., Orth. (1872).

*Podisma glacialis*, Scudd. Rev. Melanopli, p. 98 (1897).

While collecting at North Bay, Lake Nipissing, on Sept. 12, 1900, I took 10 ♂s and 5 ♀s of this insect. They differ slightly from the typical *glacialis* of the White Mountains, approaching *P. variegata* to a slight degree in several points. Having compared them with two pairs of typical *glacialis* from New England, and noticing these peculiarities, I sent a few specimens to Mr. Scudder, who says that they are "without doubt *glacialis*, though varying slightly towards *variegata*, especially in the (feebly) banded hind femora." He also notes that "the cerci of the ♂ are more smoothly rounded at the apex and the furcula shorter than in typical *glacialis*." As compared with my New England specimens, they also differ in having in every case distinctly longer antennæ and hind femora, and in the more prominent eyes; in all of these characters approaching *variegata*.

In the White Mountains Mr. Scudder has found this species on the dwarf birch (*Betula nana*), while Mr. Morse has found it most common in the various species of *Vaccinium* characteristic of mountain tops, and on dwarf cornel. Most of my specimens were found on red raspberry bushes, like *P. variegata*, at Lake Simcoe, but many were also seen on alders. Unlike *variegata*, they are not confined to swamps, but are also found in comparatively dry places.

I have two immature males of a *Podisma*, probably this species, collected by Mr. G. M. Stewart on the portage between Lakes Esnogami and Kabinakagami, in Northern Ontario. This portage is across the Height of Land, and is a little further north than the species has hitherto been recorded. One of the specimens is almost full-grown, and in both the hind femora are pale yellow, strongly banded with black. They are dated July 12 and 13, 1900.

26a. *Melanoplus extremus*, Walk.

*Caloptenus extremus*, Walk. Cat. Derm. Salt. Brit. Mus., IV., 681 (1870).

*Pezotettix junius*, Dodge. CAN. ENT., VIII., 9 (1876).

*Caloptenus parvus*, Prov. Nat. Canad., VIII., 110 (1876).

*Melanoplus extremus*, Caulfield. Rep. Ent. Soc. Ont., XVIII., 71 (1886).

I have a single female of the short-winged form of this grasshopper, collected by Mr. G. M. Stewart in a muskeg ten miles west of the portage between Lake Kabinakagami and the Matawishguia River.

At the same spot Mr. Stewart also took two males of *M. islandicus*, Blatchley, an adult and a nymph. These three specimens are dated Aug. 18, 1900. On the portage between Lakes Esnogami and Kabinakagami two mature females of *M. islandicus* were taken, July 15, 1900.

29a. *Melanoplus bivittatus*, Say.

*Gryllus bivittatus*, Say. Journ. Acad. Nat. Sc. Philad., IV., 308 (1825).

*Caloptenus bivittatus*, Uhler (pars), Say. Ent. N. A., ed LeC., II., 238 (1859).

*Melanoplus bivittatus*, Scudd. (pars), Hitchc. Rep. Geol. N. H., 1, 376 (1874).

I took a single ♀ of this grasshopper while collecting at North Bay, on Sept. 12, 1900. This is the true *bivittatus*, not the common species with red hind tibiæ, usually so-called, which is *M. femoratus*, Burm. The hind tibiæ of my specimen are dark bluish-green above at base, gradually passing into pale greenish-yellow at apex.

Although I spent some six hours collecting at North Bay, and searched carefully for both *M. bivittatus* and *M. femoratus*, I obtained but one specimen of each, both females. I expected to find *femoratus* common, as it is abundant in Muskoka, and has been taken as far north as Hudson's Bay.

*M. bivittatus* is an interior and Western form, so that its occurrence in Northern Ontario is of some interest.

*Melanoplus punctulatus*, Uhler.—During the last two seasons I have found this insect quite plentiful locally, though I spoke of it in a former paper (CAN. ENT., XXXI, 35) as one of our rarest Acridians. Until then I had never seen the male, but in the season of 1899 I found about a dozen of them, and this season I have seen more than one hundred. I found them most numerous on dead stumps and logs, in a wood of second-growth white pine, at De Grassi Pt., Ont. They were sometimes seen on the trunks and branches of living trees, but most often on the stumps and fallen trunks of the old forest, and on the pine rails of a snake fence enclosing the wood. They were found only on the borders and more open parts of the woods, where they were to be seen upon almost every stump. I have seen ten ♀s on a single stump. It is in these dead stumps and logs that the females deposit their eggs, in which operation I have

observed them repeatedly. The female chooses a crack in the wood or an old beetle-boring of suitable size, and lowers her abdomen down this, sometimes nearly as much as an inch. Sometimes when the hole is of large size, only the head and legs of the insect can be seen above it. Unlike *Chloactis conspersa*, the female of *M. punctulatus* apparently never bores herself unless merely to make her way through any loose rubbish that might be obstructing the hole. She generally chooses sound or only partly decayed wood.

I managed to obtain several fragments and one complete packet of eggs. The latter was fixed by the cement substance at its lower end to the wall of a beetle-boring three-eighths of an inch in diameter. It was attached at a distance of about three-quarters of an inch down the hole, and except at the lower end, which was imbedded in a depression in the wall, the packet was quite free. It was covered with a rather thick coating of a porous or vesicular cement substance, which also filled all the spaces between the closely-packed eggs. The latter were twenty-three in number, and their arrangement was in general in a longitudinal direction, the anterior ends pointing towards the free end of the packet, but was otherwise irregular.

The eggs are 4 to 4.8 mm. long, elongate-elliptical in form, finely and densely punctate, reddish-brown. There is a slightly impressed line encircling the egg close to its posterior end.

*M. punctulatus* has been fairly common also at Toronto this season. I found a pair on a white oak tree, the others on pine.

#### A NEW CECIDOMYIID ON GUTIERREZIA.

BY T. D. A. COCKERELL, E. LAS VEGAS, N. M.

##### *Asphondylia gutierreziae*, n. sp.

♀.—Length slightly over 3 mm.; antennæ pale brown, 2 + 15 jointed, the first two joints darkened; eyes united on vertex; thorax reddish-brown, dorsally shining, naked, with four very thin longitudinal bands of hairs; femora pale brown, tibiæ and tarsi darker; wings well fringed with hairs; abdomen nearly naked, bright red, ovipositor and a dorsal apical patch white; ovipositor moderately long.

Pupa shell white, the anterior part faintly tinged with brown.

Gall a pale green fusiform or suboval swelling in the flower-head of *Gutierrezia sarothra*, about 7 mm. long and 3 mm. broad.

*Hab.*—Las Vegas, New Mexico; collected by Wilmatte P. Cockerell; flies emerging October 31.

The colours of *A. gutierreziae* are described from fresh material; dried examples will not be so bright.

## THE GENERIC NAMES VATES AND THEOCLYTES.

BY JAMES A. G. REHN, PHILADELPHIA.

Recently the writer made the statement (Trans. Amer. Ent. Soc., XXVII., p. 87) that the generic name *Theoclytes* was a synonym of *Vates*, the latter being the older by one year. A further examination has shown that the matter should have been examined closer. Three generic names are involved—*Vates*, Burmeister; *Theoclytes*, Serville, and *Pseudovates*, Saussure—the included species of each being as follows:

*Vates*, Burmeister.

*V. cnemidotus*, Burmeister = *subfoliata*, Stoll.

*V. orbis*, Illiger.

*V. macropterus*, Stoll. } *Zoolea macroptera*, Stoll.

*Theoclytes*, Serville.

*T. foliata*, Licht. = *subfoliata*, Stoll.

*T. undata*, Fabricius = *Popa undata*, Fabricius.

*T. chlorophæa*, Blanchard.

*Pseudovates*, Saussure.

*P. tolteca*, Saussure.

The type of the genus *Vates* is therefore *subfoliata*, Stoll., the other two included species (synonymous) having been removed by Serville to his new genus, *Zoolea*, in 1839. As the species *subfoliata* was used by Burmeister (and is by elimination the type of the genus), it must be barred from consideration in the genus in which it was placed by Serville. The second species, *undata*, having been removed to another genus, the third, *chlorophæa*, must stand as the type. The last genus, *Pseudovates*, of Saussure, was based simply on *tolteca*, which is congeneric with *Vates*, and therefore the two are synonymous, unless the two types can be separated subgenerically, in which case the name *Pseudovates* is available for one. The revised generic names stand as in the following table:

*Vates*, Burmeister. Type, *V. subfoliata*, Stoll.

—— *Pseudovates*, Saussure.

*Theoclytes*, Serville. Type, *T. chlorophæa*, Blanchard.

While a few authors have followed almost the same pattern as this, the general tendency has been to distort the names by placing them to suit their fancy or their particular system of classification.

TWO NEW BLIND BEETLES, OF THE GENUS *ADRANES*,  
FROM THE PACIFIC COAST.

BY H. F. WICKHAM, IOWA CITY, IOWA.

The species of *Adranes* are to be looked for in nests of ants belonging to the genus *Lasius*. They are helpless creatures, lacking eyes and with much reduced mouth-parts, dependent probably upon the ants for their supply of food. They are carefully attended by their hosts, to whom they give requital in the form of a secretion, much appreciated by the ants, which collects on certain patches of hair situated on the tips of the elytra and on the base of the abdominal dorsum. The antennæ are much modified, consisting of only two joints, the second of which is very large and heavy, varying in form in different species.

Until recently but two species were known, namely, *A. cæcus*, Lec., from Pennsylvania, Georgia and Illinois, and *A. Lecontei*, Brendel, from the Mississippi, Potomac and Ohio\* valleys. Some time ago I received from the Rev. Geo. W. Taylor a specimen which appeared to belong to a third species. It had been captured by him in an ants' nest near Nanaimo, Vancouver Island. My trip to the Pacific Coast has given additional specimens of the same kind, and also of a fourth species which is very distinct from any of the others.

While all of the *Adranes* are of much the same colour (a peculiar shining reddish yellow) and agree closely in general shape, they nevertheless offer structural characters, particularly in the male sex, which enable us to separate them readily. I regret not to have seen *A. cæcus*, which evidently approaches the form that I have called *pacificus* in size and in some other features. I annex a table which gives in brief the differentials necessary for specific discrimination :

Head cylindrical. Antennæ with second joint narrowed to tip. L.

1.8 mm . . . . . *cæcus*, Lec.

Head narrowed behind.

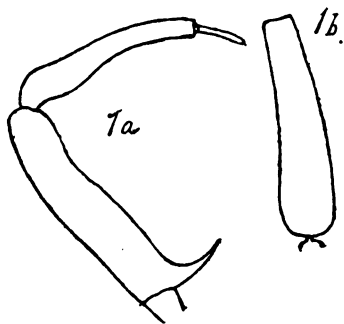
Antennæ with second joint narrowed to tip.

Smaller (2 mm.); middle tibiæ of ♂ not appreciably thickened  
near the base . . . . . *pacificus*, n. sp.

---

\*Dr. E. Wasmann has also a record of *A. Lecontei* from California. (Krit. Verz. d. Myrmekoph, u. Termitoph, Arthropoden, Berlin, 1894, p. 107.)

- Larger (2.5 mm.); middle tibiae of ♂ more slender and strongly thickened near base..... *Lecontei*, Brend.  
 Antennæ with second joint cylindrical, not appreciably narrow at tip; middle tibiae of ♂ with a strong tooth about one-third from the tip..... *Taylori*, n. sp.  
 Figures of the antennæ and middle legs of the males of three of the



above are given, the sketches having been made with the aid of a camera lucida. Care has been taken to get a like point of view in each case. The spine of the middle leg has been figured as part of the trochanter in *A. Lecontei* by Dr. Brendel\*, who was misled, I suppose, by the use of imperfect lenses. In specimens of an *Adranes* from Iowa City, determined by him as his *Lecontei*, the spine is femoral in origin, as shown in my figure

(Fig. 1a), to which I have added a sketch of the antennæ (Fig. 1b) for comparison with the others.

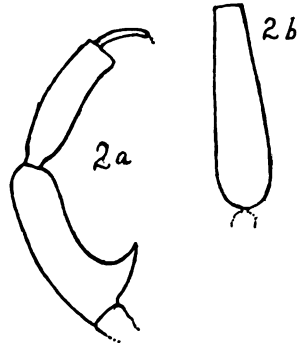
The new forms may be described thus:—

*Adranes pacificus*, n. sp.—Reddish yellow, less shining than *A. Lecontei* or *A. Taylori*. Above finely punctured, pubescence yellowish, recumbent, coarser than in either of the previously mentioned species and more inclined to form regular lines. Head (in profile from above) broadest just behind the antennæ, thence almost regularly narrowed to base, sides hardly arcuate, frontal margin truncate. Second antennal joint straight, distinctly narrowed to the tip and somewhat thicker in proportion to the length than in *A. Lecontei*. Pronotum resembling that of *A. Taylori*, but the lateral impressions are less deep, and in consequence the sides in front of them appear less bulging; basal fovea naked, deep and almost exactly circular. Elytra at base about equal to the base of the prothorax or very slightly wider, conjointly deeply

\*Bulletin from the Laboratories of Natural History of the State University of Iowa, Vol. I., pl. VI., Fig. 3. The same origin is ascribed to this spine in *A. cactus*, l. c. pl. VI., Fig. 5; and p. 221. However, I have not seen the latter species, and make no further comment.

triangularly emarginate, rapidly, slightly arcuately broadening to the tip, each with a tuft of long yellowish hair near the middle of the posterior margin, the exact shape of which is thus concealed. Abdomen above convex, surface more shining than that of the rest of the body, the pubescence long, recumbent, very fine and sparse; arcuation of the juxta-basal portion of the margin more regular and less sudden than in *A. Lecontei*, which it closely resembles in the form of the impressions and foveæ. Body beneath of the same colour as above, scantily pubescent. Legs stouter than in *A. Lecontei* or *A. Taylori*, middle femora of male with a large strong curved basal tooth, middle tibiæ slightly curved, but without strong sinuation or tooth. Length 2 mm.

Type, ♂ from Sisson, California, in the Mount Shasta district. Collected by myself in a nest of a pale variety of *Lasius niger*, L. (det. Pergande), under the bark of an old stump, near the end of July, 1900. This beetle is readily distinguished from the other Pacific Coast species by the facies, smaller size and greater opacity. Fig. 2a shows the middle leg of the ♂, Fig. 2b the antenna.



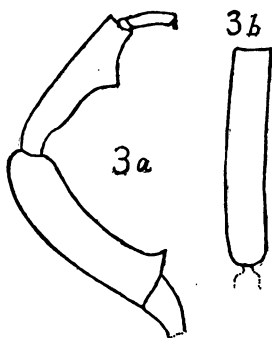
*Adranes Taylori*, n. sp.—Reddish yellow, shining, above finely punctured and with rather long yellowish recumbent pubescence, which does not conceal the surface nor give the effect of opacity. Head (in profile from above) truncate anteriorly, sides gradually slightly divergent to a point behind the middle, thence rapidly narrowed to base. Antennæ with the second joint cylindrical, not tapering to the tip. Pronotum, broadest about one-third from the base, narrowing anteriorly to about the width of the head and posteriorly to near that of the elytra. Behind this broadest part is, on each side, an oblique impression, while on the median line near the base is a large rounded hairless fovea. Base of elytra equal to or slightly greater in width than that of the prothorax, conjointly deeply triangularly emarginate; rapidly arcuately broadening to apex, each with a tuft of long yellowish hair near the middle of the posterior margin, the exact shape of which is thus concealed. Abdomen above convex, surface more shining than that of the rest of the body, the pubescence rather long,



recumbent and very fine, much sparser than that of the elytra. Width at base (compared with the elytra) less than in *A. Lecontei*, the arcuation of the juxta-basal portion less pronounced. Impression and foveæ much as in *A. Lecontei*. Body beneath of same colour as above, shining, sparsely pubescent. Legs, ♀ unarmed, ♂ intermediate femora with a short stout basal tooth, middle tibiæ sinuate internally and with a strong triangular tooth, as large as that of the femur, at about one-third from tip. Length 2.5 mm.

Type, ♂ from Newport, Oregon; collected by myself in nest of

*Lasius niger*, L. (det. Pergande), under a prostrate log, near the middle of July. Also received from Rev. Geo. W. Taylor, collected by him at Nanaimo, Vancouver Island, in March and April, and to him the species is dedicated in recognition of the value of his entomological and other researches into the fauna of his district.



The middle leg of the male *A. Taylori* is shown in Fig. 3a. It is quite characteristic and will readily distinguish this species from any other thus far known. The shape

of the second antennal joint (Fig. 3b) is also peculiar to this insect.

#### CHANGE OF NAME.

On page 248 of Vol. XXXII. of the CANADIAN ENTOMOLOGIST, I proposed *pruinus* for a species of *Tabanus*. Prof. J. M. Aldrich has kindly informed me that *pruinus* has been used previously by Bigot for a species of that genus. My species is a true *Atylotus*, and Bigot's is placed in *Tabanus* in the strictest sense, but I prefer to change the name of my species to *Ohioensis*.  
JAS. S. HINE, Columbus, Ohio.

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EDITED BY

REV. C. J. S. BETHUNE,

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APRIL, 1901.

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MAY 6 1901

# The Canadian Entomologist.

VOL. XXXIII.

LONDON, MAY, 1901.

No. 5

## SOME RECENT WORK IN THE GENUS CATOCALA.

BY OTHO C. POLING, QUINCY, ILL.

Since the revision of this genus by the late Dr. Hulst, in 1884, contributions to our knowledge have not been extensive, while the material gathered in recent years has been very great. The popularity of the genus among students of Lepidoptera had made the necessity for a revision very keenly felt, so that when Prof. French generously undertook the work, a year or so ago, a feeling of gratitude was aroused by enthusiasts, who have known the thoroughness with which his work would be attended.

In offering him my assistance, I placed at his disposal a large number of Western forms, many of them from remote localities where no great amount of collecting in this genus had yet been done. I was not greatly surprised when my own opinion of some apparently new species was confirmed by that of Prof. French. Though reluctant about presenting these new forms until more material could be gathered for a more thorough study and comparison, I have consented to do so, since the assistance offered me by a more competent scholar has enabled me to bestow full credit for the work on Prof. French, who wrote the descriptions and modestly declined to "deprive me of the pleasure of naming my new forms."

Such sincerity is in marked contrast with some modern methods, where the object of contributing to our knowledge of science is lost sight of in the keen desire for personal prominence.

*Catocala Frenchii*, n. sp.

Expanse of male, 2.50 inches ; of female, 2.75 inches.

General or ground colour, pale glaucous gray, sprinkled over with black or dark brown atoms, so as to make the general aspect a pale blackish, rather than a brownish tinge, differing in that respect from *C. Californica*. Lines distinct ; basal line black, single, with a whitish

shading outside ; t. a. line black, double ; in the female the space between this and the basal line heavily shaded, with the inner part of the line broken on the subcostal and median veins, and the whitish shading reaching the basal line in the form of a triangle ; outer part of t. a. line much heavier than the inner, the enclosed space whitish, the line strongly dentate in two outer and two inner teeth, in this much like *C. Californica*, but the teeth sharper. T. p. line double, distinct, the two extra discal teeth nearly equal, inner part of line heavy, black, outer part brown, shading into the subterminal brown shade which is faint and indistinct ; s. t. line broken, also its white anterior shade, dentate, the outer dentations capping the white shade, the inner teeth mostly wanting in the line and faint in the white, towards the posterior angle the teeth form dashes with the intervenular lunules ; the lunules distinct ; the reniform brown, with a black annulus, situated in a blackish cloud ; subreniform white, more or less sprinkled with dark scales, pyriform with a point projecting towards base of wing from the upper inner part, closed, with the line connecting with the t. p. line sometimes indistinct ; preceding the reniform is a white or whitish space in the discal cell that reaches the t. a. line in a point ; it is whitish also outside or beyond the reniform to the t. p. line, though this is more indistinct than the white in the cell ; there is also a whitish space outside the t. p. line below the extra-discal teeth ; fringe gray, with a blackish line through the middle. Hind wings red, about the shade of *C. Californica*, slightly smoky at the base and the fringe of the inner margin ; median band nearly straight, of medium width, much like the band on *Californica*, slightly constricted in the middle, bent a little at posterior end, but not narrowed into a hook as in *Strechii*, ends abruptly about one-eighth inch before inner margin, without shade in either sex connecting with the margin ; marginal band wide, inner edge straight, to opposite end of median band, then with two prominent teeth, between which is a cavity reaching one-third the distance to outer edge ; apex white, slightly yellowish, but without red, the white space narrow, no other white outside the band ; fringe white, with a gray line that is not distinct throughout.

The thorax and abdomen as in allied species. The under side much as in *C. Californica* ; fore wings without tinge of red ; the s. t. white band quite narrow in its posterior third, a sharp but not long angle on submedian vein ; hind wings with inner two-thirds of light part red ; bands as above, but dentations of marginal band less distinct.

The above description is taken from two examples, one in collection of G. H. French, the other in the collection of O. C. Poling. They were taken at New Westminster, B. C., Canada.

This species belongs to the *Californica* group, resembling that species in size, and the bands of the hind wings; but it differs in having the ground colour more of a blue or glaucous gray, the markings more distinct, and a duller red to the hind wings, a deeper excavation in terminal band of hind wings near anal angle. The subreniform is nearly or quite separated from the t. p. line.

*Catocala chiricahua*, n. sp.

Expanse, 2.75 inches.

Colour gray, in places near the apex, and along the posterior margin, nearly as pale as the ground colour of *C. Robinsonii*; with a deep brown broken shade, not at first noticeable, extending from middle of base to apex, similar to that found in same examples of *C. innubens*, but a much brighter and deeper brown; all lines deep brownish black, prominent; basal line distinct, extending obliquely outward below the median vein to the submedian, and thence along this in a shade; t. a. line single, very broad on the costa, gradually narrowing to median vein, from which it extends to middle of posterior margin in about uniform width, with only one tooth pointing inward on internal vein, the line before the tooth a gradual curve with the convex side out; the space inside the t. a. line brown, except along posterior margin, the brown deeper in the centre, a small gray spot just outside the basal line below the median vein; t. p. line single, broad, shading inward somewhat, the extra-discal teeth extending well into the s. t. brown shade, subequal, the inflexion on submedian vein sharp, closed, extending almost to t. a. line; s. t. line nearly obsolete, as also its preceding whitish shade; terminal lunules scarcely more than dots; reniform brown, centre paler, a whitish annulus, with a median shade obliquely above the reniform, with the lower part of reniform in the edge of the central longitudinal shade that runs through the wing, the outer part with four more or less distinct teeth; subreniform prominent, rather wide open, white to the s. t. brown shade sprinkled with pale brown scales; scales of the s. t. brown shade and subreniform yellowish brown, those of the longitudinal shade mostly vandyke brown; in the cell and separated from it by its black annulus is an oblique white space or patch, not quite so large as the subreniform, that has a few brown scales, making with the subreniform an oblique whitish stripe from



near the subcostal vein to the s. t. brown shade ; the s. t. brown shade a little pale below the teeth of the t. p. line ; fringe gray, with a very little pale at the base.

Hind wings rich rosy crimson, about the colour of *violenta* and *Verilliana*, smoky at the base ; median band of medium width, wavy, almost broken by a sharp excavation on submedian vein, a few red scales between the line and the inner margin, where it ends a point of a triangle, the band is broad on the costa ; terminal band broad, inner edge slightly wavy, not excavate before anal angle ; apex very narrow, red ; a few red dots on edge of wing between the veins outside the terminal band, just before anal angle a narrow red patch with the fringe at this point also red ; elsewhere, fringe at apex white faintly rose tinted ; the rest of fringe black, with a little rosy white where the red dots are.

Under side with the black bands broad, the median of hind wings not reaching internal margin except by a faint shade ; the light bands of fore wings rosy, with white on the costa of the outer one ; posterior two-thirds of hind wings rosy red, the anterior part of outer band white with a rosy tint, the anterior part of base gray. Body as in allied species.

Described from one female from Southern Arizona, in the collection of O. C. Poling, Quincy, Ill. It stands between *aholibah*, Strecker, and *violenta*, Hy. Edw. The hind wings are more like *violenta*, of a brighter red than *aholibah*.

The shade of fore wings is much like that of *aholibah*, but brighter, and the s. t. brown shade much lighter. It is in general a much brighter insect than *aholibah*. It is much larger than *violenta*, and differs from *aholibah*, *violenta* and *Verilliana* in having a wide open subreniform.

*Catocala fratercula*, var. OUWAH., n. var.

This form, taken at Quincy, Ill., is between var. *gisela* and var. *Jacquetta*.

The general tint is brownish gray, the brown of the vandyke type instead of olivaceous ; pale gray in the cell before the reniform ; a deep brown longitudinal shade runs from the base to the apex, that is broken only by the subreniform being a little paler, the whitish shade preceding the s. t. line broken by this shade. It differs from *gisela* in the base along the posterior margin and the terminal margin not being pale, and in the central shade being more distinct. The hind wings resemble *gisela*, but the anterior part of the median band is wider than in *gisela*.

Described from one specimen in the collection of O. C. Poling.

*Parthenos nubilis*, var. APACHE, n. var.

Smaller and much paler than the northern form. Markings of fore wings do not differ from those of the typical form. Hind wings pale yellow. All bands much reduced. Heavy black marginal band of the northern form is only represented by a few black scales on the veins, while all the space between veins is yellow. Submarginal band indistinct, nearly disappearing before it reaches upper margin.

Easily distinguished at a glance from the northern form by the row of dots which replaces marginal band and other characters above mentioned. Types, seven examples in the collection of Dr. William Barnes, of Decatur, and that of the writer.

#### NEW NORTH AMERICAN ORTHOPTERA.

BY A. P. MORSE, WELLESLEY, MASS.

*ODONTOXIPHIDIUM*, gen. nov.—Allied to *Ziphidium*, from which it is probably derived. Distinguished from that genus by the form of the anal cerci of the male, which are elongate, straight, with the lateral tooth reduced in size, and an additional tooth upon the dorsal side near the base; and, in the type, by the form of the pronotum, which is sub-sellate and prolonged backward, covering the base of the abdomen both above and on the sides, in correlation with the absence of flight-organs. The type is *O. apterum*, described below.

*Odontoxiphidium apterum*, sp. nov.—Pronotum sub-sellate, the dorsum straight (♂) or slightly convex (♀) in longisection, smoothly convex in transection, the sutures nearly obsolete, the lateral canthi entirely lacking; posterior margin of lateral lobe nearly straight, passing into the posterior margin of hind process with a barely perceptible sinuosity at an angle of 45° with the dorsum when viewed from the side. Tegmina and wings absent in ♀, tegmina alone present in ♂, covered at base for one-third to one-half their length by the pronotum, the exposed portion one-half to two-thirds as long as the pronotum, vaulted, even the speculum convex, opaque, and abbreviated. Hind femora very stout, almost bulbous, at base. Cerci of ♂ straight, slender, evenly tapering, about as long as the last two segments on the dorsum, the usual lateral, inwardly directed tooth small, about two-thirds as long as apex of cercus and borne at base of distal third, the stem of the cercus (proximal two-thirds) elongate and bearing an additional, dorsally-directed denticle

about midway between the lateral tooth and the base. Supra-anal plate of the ♂ with the posterior process narrow, sub-quadrate, the apical angles rounded, the entire process usually strongly deflexed. Ovipositor straight, about five-sixths as long as the hind femora, acute and symmetrical at tip.

Body: ♂, 11-13; ♀, 11-18. Pron.: ♂, 3.5-4; ♀, 4.5-5.3. Teg.: ♂, 2-3. Post. fem.: ♂, 10-12; ♀, 13-15. Ant.: ♂, 45-60; ♀, 45-50. Ovip.: 10.5-12 mm.

Rusty or olivaceous above, the face and sides of body greenish. A well-marked brown, median dorsal band sometimes present, bordered on each side by a narrow pale line. Sides of abdomen of male sometimes more or less infuscated. Abdomen of young marked with a conspicuous, broad, median fuscous band.

Twelve ♂, fifteen ♀, two young, Aug. 15-Sept. 5, Hastings, Fla. (Brown); 1 ♀, Sandford, Fla., G. B. Frazer (Scudder).

*Scudderia cuneata*, sp. nov.—In dorsal view the anal segment of the male resembling that of *furcata* (see Scudder, Proc. A.A.A.S., 1898, fig. 8), but with the excavation at apex deeper, twice as deep as its middle width, the sides sub-parallel or slightly approximated distally from the middle, convergent to a very bluntly rounded apex at base of furcation; limbs of the furcula relatively slender, slightly approximate at tip, obliquely depressed. In lateral view similar to *Mexicana*, but with the furcula narrow and sub-acute at tip and the subapical flanges appearing as if truncate, the emargination reduced to a shallow excavation, the outline of the apex as a whole roughly cuneate. Sub-genital plate reaching tip of anal segment, strongly arcuate, rather slender.

Pronotum with parallel sides and distinct lateral canthi. Posterior femora spinulose, the spines three in number on outer, six on inner edge, very small, black. Tegmina long and narrow, apex rounded.

Body: ♂, 22. Post. fem.: 25. Teg.: 30x5.5. Wings pass teg.: 5. Ant.: 45 mm.

Green. Antennæ, tarsi and apices of tibiæ of anterior and middle legs, dorsal margin of tibia opposite sense organ, and lateral canthi of pronotum, rufo-flavescent, palest on pronotum, darkest on tarsi. Posterior tarsi and apical seven-eighths of tibiæ infuscated.

One ♂, Alabama (Baker).

*Hesperotettix Floridensis*, sp. nov.—Resembling *H. speciosus* (from which it is readily distinguished by the shorter tegmina), but rather

smaller, the pronotum more finely rugulose, the mid-carina less pronounced and nearly or quite obsolete on the prozona. Tegmina ovate, about two-thirds as long as wide. Furcula variable, consisting usually of a pair of minute rounded lobes nearly as wide and long as the width of last dorsal segment at their base, but sometimes obsolete. Cerci resembling those of *speciosus*, but more finely pointed, twice as long as their width at base, the basal three-fifths tapering evenly, the distal two-fifths equal, acutely pointed, straight or a little incurved. Female with both valves of the ovipositor slender, their ento-horizontal contours relatively straight, and both dorsal and ventral scoops elongate.

Body: ♂, 17.5-21; ♀, 24-30. Post. fem.: ♂, 11.5-13; ♀, 15-16. Teg.: ♂, 4.5-6; ♀, 5-7. Ant.: ♂, ♀, 8-10 mm.

Grass-green, yellowish beneath, with more or less rufous on the anterior faces of the anterior and middle femora and the dorsal carina of the external face of the posterior femora. Posterior tibiae bluish-green.

Fourteen ♂, four ♀, Aug. 15-28, Hastings, Fla. (Brown).

The following key may be added to that of Scudder—Rev. Melanopli, p. 57—under A<sup>2</sup>:

- b<sup>1</sup>. Tegmina elongate, two to five times as long as broad, roundly acuminate at tip. . . . . *H. speciosus*.  
 b<sup>2</sup>. Tegmina ovate, at most one and one-half times as long as wide. . . . . *H. Floridensis*.

#### CANNIBALISM AMONG CATERPILLARS.

The following interesting notes upon this subject are taken from a paper recently received from Mr. L. de Nicéville, of Calcutta\*:

"The larvæ of many kinds of butterflies will, when they cannot get vegetable food, eat each other or soft, newly-formed pupæ. Mr. Bell has found that the greatest cannibals in this respect are the larvæ of certain Lycænidæ, and the worst among these, again, are the larvæ of *Zesius chrysomallus*, Hübn., for these will at times, even when plentifully supplied with their proper vegetable food, eat any larvæ which may be in a fit state to be eaten; i.e., which are either on the point of casting their skins, have just cast them, or are just going to pupate. The Lycænid larvæ, which

\*"The Food-plants of the Butterflies of the Kanara District of the Bombay Presidency, with a revision of the Species of Butterflies there Occurring"; by Lionel de Nicéville, F. E. S., etc. Reprinted from the Journal, Asiatic Society of Bengal, Vol. LXIX., Part ij., No. 2, 1900, pp. 187-278.

are most addicted, after that of *Z. chrysomallus*, are those of the *Amblypodia* and *Tajuria* groups, those of *Arrhopala* and *Rapala* being nearly as bad. He has known one larva of *Tajuria cippus*, Fabr., to eat up over a dozen young ones of its own species. In Kashmir Mr. Bell bred a single imago of *Hysudra selira*, Moore, from a larva which had been reared on the dead leaves and flowers of its food-plant, *Indigofera atropurpurea*, Hamilt. (Natural Order Leguminosæ), together with several newly-formed pupæ of its own species. The imago was a very fine, large specimen, so that the insect diet evidently agreed with the larva. Mr. Bell particularly noticed this fact, as in all his previous experience he had been led to the conclusion that a cannibal diet was bad for the stomachs of the larvæ practising the habit of eating up their fellows, as they, as a general rule, have not been healthy, and have died before pupating.

"The tendency to cannibalism is not confined to the *Lycenidæ*, but exists also amongst the *Pierinæ*; the larvæ of *Appias* will eat each other and any other species of larva feeding on the same food-plant as themselves, if forced to it by hunger. He has seen the larvæ of *Appias libythea*, Fabr., and *A. taprobana*, Moore, eat freshly-formed pupæ of their own species, as well as larvæ changing their skins, and also the larvæ and pupæ of *Leptosia xiphia*, Fabr. Some of the caterpillars of the *Danainæ* will, when food is not to be had, eat individuals of their own species.

"Mr. Bell has never known a larva to eat another larva feeding on a food-plant of a species different from its own, so it is probable that all larvæ taste strongly of the plant they feed on, and it is also probable that cannibal larvæ are hardly conscious that they are eating up each other, being only guided to their proper food by the sense of taste, or possibly to a less extent by the sense of smell. None of the larvæ of the *Satyrinæ*, *Elymniinæ*, *Amathusiinæ*, *Acreinæ*, *Nymphalinaæ*, *Libythainæ*, *Nemeobiinæ*, *Papilioninæ*\* or *Hesperiidæ* have been found by Mr. Bell to eat anything but vegetable food. All rhopalocerous larvæ, however, with but very few exceptions, eat their own cast-off skins while these are still soft and moist; and the young larvæ on emerging from the egg will almost invariably, under normal conditions, make their first meal off the empty egg-shell. He notes that all the butterfly larvæ he has bred change their skins five times from the time they leave the egg to the time they turn to pupæ."

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\*The larvæ of *Papilio philenor*, Linn., whose food-plant is *Aristolochia siphon*, have been known to devour their comrades in captivity when supplies ran short.—ED.

## ON SOME BEES OF THE GENUS AUGOCHLORA.

BY E. S. G. TITUS, FORT COLLINS, COLO.

*Augochlora Coloradensis*, n. sp. (subg. *Augochlora*).

♀.—Green, often tinged with purple; face finely and confluent punctured above the base of the antennæ, more coarsely, confluent so below, supraclypeal space sometimes not confluent punctured; clypeus with large punctures, black at tip; basal process of labrum subquadrate, broadly rounded, rufopiceous; mandibles black, rufous at tips; antennæ black, flagellum near the tip fulvotestaceous beneath; striation of the disc of the metathorax reaching to the summit, posterior truncation rounded above, lateral portions rounded, truncation not shining, rugosely punctured; tegulæ, often with a black dot in the centre, stigma and nervures testaceous; legs piceous, femora and tibiæ sometimes with a greenish cast, knees testaceous, tips of tarsi generally inclined to rufous; hind tibial spurs of posterior leg finely serrated; abdomen shining, polished, finely punctured; ventral segments black; *pubescence* of face, sides of thorax, tarsi partly, and abdomen, whitish; scutellum and first dorsal abdominal segments very fine and short, margins of segments fringed with white hairs; hair on tarsi often inclined to be rufous. Length, 6–7 mm.

♂.—Green; clypeus sometimes confluent punctured, slightly produced, anterior edge of clypeus and posterior portion of labrum white, labrum polished, testaceous anteriorly, slightly notched at tip; mandibles black at base, yellowish in middle and distinctly rufous at tips; antennæ black, flagellum, except last joint, yellowish testaceous beneath; thorax finely closely punctured, with the impressed lateral and central longitudinal lines smooth and distinct; striation of disc of metathorax as in female; posterior truncation distinctly bounded by carina; groove shallow; tegulæ, stigma and nervures testaceous, wings hyaline; legs green, knees testaceous, anterior tibiæ with the green restricted to a line posteriorly, two posterior pairs of tibiæ at the tips, and all the tarsi, darker toward tips, yellowish testaceous; abdomen shining, rather closely and finely punctured, apical portion of first segment somewhat constricted; ventral segments black, fourth widely emarginate; face, clypeus, cheeks, scutellum, legs and abdomen dorsally, sparsely clothed with whitish pubescence, ventral segments with fine short sparse white pubescence. Length, 5–6 mm.

Described from numerous females: Ft. Collins (5,000 ft.) and Boulder in May and June, Ft. Lupton (4,500 ft.) in July; and two males

on *Aster commutatus* at Ft. Collins, Colo., August 29. Females were taken on *Helianthus annuus* and *Malvastrum coccineum*.

A specimen from Ft. Lupton, Colo., has the second submarginal cells very narrow and also narrowed above; and one of the male specimens has the second submarginal cell in the left wing petiolate, the first and second transverse nervures being coalescent for one-third of their length above, the first recurrent nervure entering the second submarginal cell near the middle in both wings.

This species is closely related to *A. pura*, Say, *A. similis*, Robt., and *A. confusa*, Robt.; but seems to be easily separated from the descriptions of either of them. I have an *Augochlora* from Mr. E. P. Van Duzee, taken at Colden, N. Y., which answers to the description of *pura*, Say.

*A. Coloradensis* may be separated from *A. pura*, Say, by colour of thoracic pubescence, base of mandibles with no green spot, abdominal segments never margined with black; from *A. confusa*, Robt., by the less metallic tibiæ and tarsi; from *A. similis*, Robt., by the pure green colour, abdominal segments not at all testaceous. Although near *A. neglectula*, Ckll., it is a narrower species and also differs in colour and pubescence. I possess two specimens from Elmdale, Mich., that I believe are referable to *A. similis*, Robt.

*Augochlora neglectula*, Ckll. (subg. *Augochlora*).

*A. neglectula*, Ckll. Bull. 24, N. Mex. Agrl. Stat., Aug., 1897, p. 43.

Two female specimens: Ft. Collins, Oct. 17, and Greeley, Sept. 17. The former was taken on *Chrysopsis villosus*. This is a bluer species than *A. Coloradensis*, and the flagellum of the antennæ is uniformly paler. There are New Mexico specimens in our collection presented by Prof. Cockerell.

*Augochlora humeralis*, Patton (subg. *Augochloropsis*, Ckll.).

*A. humeralis*, Patton. Bull. U. S. Geog. Surv., 1879, p. 365, n. 39. Ashmead, Bull. 1, Colo. Biol. Assoc., 1890, p. 31.

This species has been recorded from the State, but I have seen no specimens from Colorado that I can refer to it. Specimens from Onago, Ks., (F. F. Crevecoeur) answer to Patton's descriptions. Mr. Ashmead very kindly examined specimens in the U. S. N. M. of *A. humeralis*, Patt., marked "N. W. Kans., Williston," and writes me that the hind spur of the hind tibiæ of the ♀ has but *three* spines.

*Augochlora cleomis*, n. sp. (sub. *Augochloropsis*, Ckll.). Fig. 6.

♀.—Blue-green; face above antennæ very finely confluent punctured, below antennæ more coarsely so; clypeus black at tip, punctures

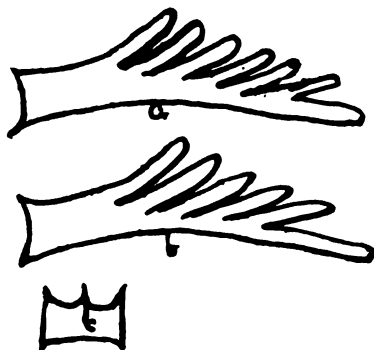


FIG. 6.—a Hind tibial spur of *A. cleomis*, female.  
b Hind tibial spur of *A. cerulea*, female.  
c Fourth ventral segment of *A. cleomis*, male.

large and deep; labrum rufotestaceous; mandibles black with a green spot at base, rufous in middle and darker at tips; antennæ black, flagellum dark rufotestaceous beneath; prothoracic angles sharp, tubercles prominent; mesothorax very closely and finely punctured anteriorly, more sparsely so posteriorly; postscutellum with some larger separate punctures; metathoracic disc roughened, posterior truncation rounded above, distinctly punctured, lateral angles sharp, median groove shallow; tegulæ green, with a black spot shading into yellowish testaceous on the outer edges; wings hyaline, nervures and stigma yellowish testaceous, costal nervure of anterior wings very dark; anterior and middle femora and all the tibiæ blue-green, posterior femora piceous, all the tarsi testaceous, hind tibial spur of hind legs with six spinous processes; all the tarsi, two posterior pairs of tibiæ and hind femora with dense pale pubescence; abdomen closely finely punctured, covered with short pale hairs, apical margins of first and second segments depressed slightly, fringed with short pubescence, ventral segments reflecting blue-green, densely pubescent; thorax, scutellum, postscutellum, behind tubercles, behind wings, and along the lateral sides of the posterior truncation with pale ochraceous pubescence, face clothed with short pale pubescence, cheeks with long white pubescence. Length, 8 mm.



♂.—Resembles the female; clypeus strongly produced, entirely green; labrum dark rufopiceous; flagellum testaceous beneath; tegulæ with more yellow than in female and with no black spot; mesothorax more closely punctured; legs green, tarsi yellow, testaceous at tips, legs with pale pubescence; abdomen shining, closely punctured, pubescence as in female, but the short pale pubescence of the segments is heaviest near the apical margins of the segments; fourth ventral segments so produced posteriorly in the middle as to form two deep curves on each side (see drawing). Length, 9 mm.

Described from a male (Aug. 19) and a female (July 17) taken on *Cleome serratula*, in Horsetooth Gulch, near Ft. Collins, at an altitude of over 7,000 ft.

This species differs from *A. humeralis*, Patt., as identified by specimens in the collection here, by the pale ochraceous pubescence, prothoracic margin not sinuous, posterior truncation not shining, median groove shallow, legs blue-green, not black beneath, hind tibial spur of female; colour of tegulæ; and first three ventral segments being green. The male most resembles *A. fervidus*, Smith, but that is described as having long white hair on the legs, and tarsi pale testaceous with yellow hair.

*Augochlora cærulea*, Ashm. (subg. *Augochloropsis*, Ckll.).

*Agapostemon cæruleus*, Ashmead. Bull. 1, Col. Biol. Assoc., 1890, p. 7.

♂.—Entirely blue; pubescence rather dense, short, appressed, whitish, denser on face, and on apices of first and second abdominal segments, where it is longer and forms yellowish ochraceous hair-bands; face and occiput, excepting clypeus and supraclypeal space, very closely densely punctured; clypeus with elongate shallow separate punctures, and slightly produced, hardly truncate at tip, shining; supraclypeal space with round separate punctures; face and cheeks with rather long dense white hairs; mandibles with a green spot at base, rufous in middle and with darker tips; only the scape and three joints of the flagellum remain; the original description reads: "Antennæ ferruginous, blackish above." Prothoracic angles sharp, more prolonged than in *A. cleomis*, joining the prominent green tubercles by a curved line, which is fringed with short hairs; mesothorax finely closely punctured; scutellum with fine punctures, not very close in centre; postscutellum finely confluent punctured; disc of metathorax shining, green, punctured, lateral angles sharp, base of

metathorax very finely punctured except around the posterior edge and sides, where the punctures are *very few* and scattered; sides of metathorax finely confluent punctured, base distinctly enclosed; thorax on sides and beneath, scutellum, behind tubercles, with medium ochraceous hairs; tegulæ deep blue-green, smooth in centre; wings hyaline, nervures and stigma testaceous; legs blue-green, tarsi yellowish testaceous, darker at tips; anterior and middle legs fringed with pale pubescence, becoming somewhat rufous near the tips of the tarsi; posterior legs wanting; abdomen dorsally, purple, finely closely punctured, entirely covered with short pale hairs, four apical segments more densely pubescent; fourth ventral segment as in *A. cleomis*, but the curvatures are not nearly so deep; first, second and third ventral segments densely, closely punctured, violet blue, posterior margin of second and third with a triangular space in the centre, extended narrowly along the sides, smooth and testaceous, remaining segments black, venter with very short hair. Length, 11 mm.

♀.—Resembles the male closely; pubescence dense on sides of face, cheeks, beneath, and clypeus, behind wings, on scutellum and pleura, quite dense; thorax closely, finely, partly confluent punctured, pleura more coarsely so; metathorax with a faint trace of triangle, truncation shining, punctured; tegulæ green with an impunctate wide outer margin; legs green, femora darker beneath, tarsi and tibiæ piceous, inclined to ferruginous at tips; anterior and posterior legs and middle tarsi with dense pale pubescence; hind spur of hind tibiæ pectinate with *five* pointed spines; venter piceous, with a decided bluish tinge, margins of segments testaceous, fringed with hair. Length, 10 mm.

Male taken at Denver, Colorado, by Mr. Horace G. Smith, and is in Mr. Ashmead's collection. Through the kindness of Mr. Ashmead, I have had the type specimen to examine. The female was taken at Ft. Lupton, Colo., (R. Haynes) and is now first described.

I wish to express my thanks to Prof. Cockerell and Mr. Wm. H. Ashmead for the many favours I have received from them during the preparation of this article.

On October 30th, 1900, at 8.25 a. m., I watched the emergence of a male *Vanessa antiopa* from its chrysalis. The temperature was 51°, with a stiff breeze blowing. The chrysalis was under the ledge of a fence and had been exposed to several degrees of frost. Several of the same species emerged during the previous week. A. E. NORRIS, Montreal.

## THREE NEW PARASITIC HYMENOPTERA FROM SOUTH AFRICA.

BY WILLIAM H. ASHMEAD, ASSISTANT CURATOR, DIVISION OF INSECTS,  
U. S. NATIONAL MUSEUM.

Prof. Charles P. Lounsbury, Government Entomologist, of Cape Town, South Africa, has recently sent to Dr. L. O. Howard, U. S. Entomologist, a lot of bred parasitic Hymenoptera for names, among which were found three new species, which, at the request of Dr. Howard, are characterized below :

## Family LVII.—PLATYGASTERIDÆ.

Genus *Allotropa*, Förster.(1) *Allotropa Lounsburyi*, new species.

♀.—Length, 0.9 mm. Polished black ; antennæ and legs mostly brown or brown-black, the base of the scape, pedicel, funicle joints 1 to 4, trochanters, knees, base of tibiæ, the tarsi except last joint, and the petiole of abdomen, yellow. Wings hyaline, entirely veinless, except the subcostal vein which terminates in a small knob.

The antennæ are 8- or 9-jointed; depending upon whether the enlarged antepenultimate joint is counted as a single joint or as two closely-united joints ; funicle joints 1 to 4 much slenderer than the pedicel or joints 5 and 6 of funicle, the first joint being not quite twice as long as thick, the second shorter, the first and fourth subequal, subquadrate. The abdomen elongate, conically pointed, about one-third longer than the head and thorax united, the petiole very short, wider than long, while the second segment is large and occupies about half of the whole surface of the abdomen.

♂.—Length, about 0.8 mm. Agrees well in colour with the female, but differs in having the antennæ distinctly 9-jointed, the joints being distinctly separated, the flagellum filiform, the joints oblong, with whorls of sparse long hairs, while the abdomen is oblong oval, not pointed at apex and not longer than the thorax.

Type.—Cat. No. 5727, U. S. N. M.

Hab.—Cape Colony, South Africa.

Host.—Rhynch. : *Dactylopius* sp. on Gorse.

Bred by Prof. Chas. P. Lounsbury, Oct. 22, 1898.

The Platygasterids, so far as we know, are parasitic only upon Dipterous insects, and probably this species will be found to be a hyperparasite upon a Dipteron infesting the scale insect.

Family LXVII.—ENCYRTIDÆ.

Genus Coccidencyrtus, Ashmead.

(2) *Coccidencyrtus flavus*, new species.

♀.—Length, 0.8 mm. Golden yellow; legs yellowish white; antennal club brown; eyes brown-black. Wings hyaline, the marginal vein punctiform, not longer than thick, the postmarginal scarcely longer than the radius or stigmal vein; the stigmal vein, although comparatively short, is fully twice as long as the punctiform marginal vein and terminates in a little knob.

The flagellum is subclavate, the funicle 6-jointed, the joints submoniliform, increasing in width and size to the club, the first three or four joints being very small, narrower than the pedicel, the sixth about as wide as the pedicel, the club stouter, cone-shaped and as long as, or a little longer than, funicle joints 3 to 6 united.

Type.—Cat. No. 5728, U. S. N. M.

Hab.—Cape Colony, South Africa.

Host.—Rhynch.: *Dactylopius* sp. on Gorse. (Chas P. Loundsbury.)

Evidently the same thing, only slightly differently coloured, being more of a brownish yellow, having the sutures of the thoracic sclerites, a spot on the anterior part of the thorax and a band across the base of the abdomen, dark brown, but otherwise agreeing structurally; was bred by Prof. Loundsbury from a *Lichtensia* sp. on Pittosporum.

Family LXXI.—EULOPHIDÆ.

(3) *Tetrastichus prospalta*, new species.

♀.—Length, 0.7 mm. Black (possibly polished, the specimens being mounted on a slide in balsam, and the sculpture, if any, not being noticeable); face anteriorly and the legs, except the hind femora, apparently pale yellow; hind femora brown. Wings hyaline, the tegulæ and veins pale yellowish; the front wings, from base to the origin of the marginal vein, are wholly hairless, beyond they are closely, finely hairy and ciliate at margins; the marginal vein is very slightly longer than the subcostal, while the stigmal vein is much less than its length.

Type.—Cat. No. 5729, U. S. N. M.

Hab.—Outspoon, South Africa.

Host.—Hym. : *Prospalta aurantii*, How., infesting a *Mytilaspis* sp. on *Salix Capensis*.

## THE LIFE-HISTORY OF THE GREENHOUSE LEAF-TYER.

(*Phlyctænia ferrugalis*, Hbn., = *Botis* Harveyana, Grt.)

BY DR. JAMES FLETCHER AND ARTHUR GIBSON, OTTAWA.

The larvæ of *Phlyctænia ferrugalis*, Hbn., have been since 1897 the cause of some loss to roses in the large houses of Mr J. H. Dunlop, Toronto. References to this occurrence will be found in the Reports of the Entomologist and Botanist to the Dominion Experimental Farms for 1899 and 1900.

On the 12th November, 1900, a visit was paid to the above houses by Mr. Gibson, and specimens of the mature larvæ found feeding both on violets and chrysanthemums were secured, as also some larvæ in other stages of development. These all changed to pupæ, and in due course the moths appeared, the pupal state lasting from 17 to 20 days.

On the 4th December six moths, which had just emerged (the whole six within three days), were placed in a muslin bag over a violet plant. On the 7th December a large number of fresh eggs were noticed. They were laid on the under side of the leaves, sometimes singly, in pairs, in rows of 3 or 4, or in clusters of from 3 to 7, placed close together and overlapping at the edges.

The following notes, describing the egg and larval stages, were made:

*Egg*.—0.5 mm. in width, round in outline, much flattened, slightly raised in centre, pearly white, coarsely reticulated, and, from their flattened appearance, remarkably like those of the Codling Moth. Before hatching, the black heads of the young larvæ are very apparent through the shell.

The eggs which were laid on the 7th December hatched in a warm office on the 21st December, making the duration of the egg state 14 days.

*Stage I*.—Length, 2 mm. General appearance, semi-translucent creamy-white larvæ, body bearing long whitish hairs. Head 0.2 mm. wide, rather flattened, horizontal, inclined to be wedge-shaped, large, deep black, shining, and bearing slender whitish hairs. Mouth-parts pale brownish. Tubercles on segments piliferous and faintly darker than body,

the hairs whitish and slender. Skin of body smooth and shining. Thoracic feet and prolegs concolorous with body, all bearing short whitish hairs. After feeding, the colour of the green food contents gives the young larvæ a light greenish appearance.

The young larvæ feed on the under side of the leaves, and eat little holes into the soft tissue. When at rest they curl the head and front segments around to the side of the body, and if disturbed, fall and hang suspended on silken threads. When settled on a leaf, the young larva spins a few threads of delicate silk, from one portion of the leaf to another, feeding and living inside this slight, almost transparent enclosure.

On the 28th December one larva passed the first moult. Before moulting (a day or so), its colour changed, becoming very pallid. On the 29th December two more larvæ passed the first moult, and by the morning of the 31st December, eleven specimens had moulted.

*Stage II.*—Length, 2.5 mm. General appearance, shiny, semi-translucent, creamy larvæ, with a greenish tint, some specimens whitish; after feeding, dorsal surface distinctly green; body bearing long whitish hairs. Head 0.27 mm. wide, indented at vertex, rather flattened and horizontal, and shaped as before, shining, blackish-brown, in some specimens light brownish mottled with darker spots, margins of clypeus distinctly darkened, ocelli black, mouth-parts brownish, the face bearing slender light hairs. Body cylindrical, tapering slightly towards extremities, segments deeply divided, skin smooth and shining. Green dorsal vessel distinct, on either side of which are two very faint bands. Tubercles piliferous, larger and more noticeable than in last stage, the hairs long and slender. On segment 2 are two distinct black spots, one on each side, at margin of dorsal area. The thoracic feet and prolegs are concolorous with ventral surface of body, and bear slender pale hairs.

On the 7th January two larvæ were swollen and the next day they passed the second moult. Other specimens moulted on the 9th and 10th January.

In this moult, as in the previous one, the cast skin and head remain united, and look as if the larva had simply shrunk and dried up.

*Stage III.*—Length, 3.5 mm. General appearance, shiny, semi-translucent, pale green larvæ, with a green dorsal vessel and faint stripes down the back, the body bearing slender whitish hairs. Head 0.4 mm. wide, shaped as before, deeply indented at vertex, slight furrow between cheeks, pale brownish-yellow, rather translucent, mottled with brown

blotches, some specimens almost wholly light brown with darker blotches; margins of clypeus darkened in some specimens, ocelli black, mouth-parts brownish, in some examples light reddish, antennæ pale, darkened at tips, hairs on face white, long and slender. Body shaped as before: after feeding, dark green dorsally, pale ventrally. Piliferous warts large, but rather indistinct, hairs white, long and slender, skin smooth and shining. Dorsal vessel dark green, distinct, bordered on each side with two white bands. On segment 2 are the two distinct black spots as before. Spiracles are very small and faint, and are joined by an almost imperceptible white, hair-like line. Thoracic feet and prolegs concolorous with ventral surface of body, all bearing slender pale hairs.

On the 14th January three specimens were slightly swollen, and by the morning of the 15th had passed the third moult.

*Stage IV.*—Length, 6 mm. The general appearance of the larvæ in this stage is the same as in stage III. Head 0.67 mm. wide, small, not quite as large as segment 2, shaped as before, deeply indented at vertex, slight furrow between cheeks, honey colour, with pale brownish blotches, margins of clypeus not so distinctly darkened as before, but slightly furrowed at sides, mouth-parts pale reddish, antennæ honey colour, darkened towards tips, ocelli black. On lower side of cheek, close to posterior margin, in line with ocelli, there is a distinct black spot. The whole face bears slender pale hairs. Body tapers slightly towards extremities, as before; piliferous warts concolorous with body, each bearing a single long, slender, whitish hair. Dorsal area dark green, sides and venter pale green. On segment 2 the two black spots are the same as before, but now appear as if in a small rounded cavity. Behind each of these large spots, almost touching them, is a very small black dot. Segments deeply divided. The dorsal vessel and the double sub-dorsal band are very distinct in this stage. In some specimens the green space between the two bands bordering each side of dorsal vessel is suffused slightly with white. Spiracles whitish, joined by a distinct, slightly wavy, white line. Thoracic feet and prolegs concolorous with venter, all bearing a few slender hairs. The thoracic feet have each two blackish dashes exteriorly. The anal prolegs are extended, giving a bifurcate appearance to the anal segment.

During stage IV. the larvæ increased rapidly in size, and consumed much food, and also spun considerable quantities of silk.

On the 19th January one larva passed the fourth moult, and others on the 21st and 22nd January.

*Stage V.*—The general appearance of the larvæ in this stage is the same as in the last two stages. Length at rest, 11 mm. Head 1.0 to 1.1 mm. wide, large, about the same width as segment 2, shaped as before, deeply indented at vertex, and slightly furrowed between cheeks, pale honey colour, splashed with light brownish angulated blotches, which are larger than in stage IV., and mostly on cheeks. Mouth-parts pale reddish brown, antennæ pale, darkened at tips, ocelli black. The distinct black spot on the lower side of cheek, near posterior margin, is not now present, but close to where it was is a large elongated brownish blotch. Hairs on face and around mouth-parts pale and slender. Shape and colour of body as before; segments not so deeply divided as in last stage. The two large black spots on segment 2 are as before, as are also the two small black spots, observed in last stage, close behind these. In some specimens these latter spots are hardly visible, and in a few larvæ the large spots appear as if simply expanded slightly posteriorly. The piliferous warts resemble small swellings, and, being concolorous with body, are indistinct, unless examined with a lens. The large lateral warts on segment 2, just above the thoracic feet, bear a few brownish blotches. The dorsal vessel, the double sub-dorsal band, and the slightly wavy line joining the spiracles, are as before, but are faint on segments 2, 3, 12 and 13. The spiracles are small and whitish, slightly darkened at edge. The thoracic feet are concolorous with ventral surface of body, and bear two blackish-brown dashes exteriorly, prolegs pale; all the feet bear slender hairs. Anal prolegs divergent. Position of tubercles normal, except that ii is almost exactly in a line posterior to i.

When mature, the larvæ at rest measure 15 mm. long, and when extended, 18 mm.

On the 29th January one larva folded a leaf over, preparatory to changing to pupa. On the 30th January the folded portion was sealed, and by the 1st February the larva had changed to pupa. Another which began to spin its cocoon on the 30th January had changed to pupa by the 2nd February. In the remaining specimens the period covering the change of the larvæ to pupæ agreed with the above two.

When forming its cocoon, the larva simply folds over a portion of a leaf, and fastens it with threads of fine white silk, or choosing a central portion of a leaf, draws down another leaf to serve as a covering, and



then changes to pupa. The cocoon itself is very slight, and is merely a web or covering of slender threads of white silk.

*Pupa*.—Length, 8.75 mm.; width at widest part, 2 mm. The wing-cases and thorax are shiny black, lightly chased with vermiform lines. The abdomen is dull black, and finely shagreened, the segments transversely wrinkled on dorsum; the folds between the segments are ochraceous. On the thorax are 10 rather long, stiff, blunt, rust-red bristles, curving forward, 5 on each side, and along the dorsum are 2 series of conspicuous black warts, 1 on each side, each bearing a single, long, rusty, twisted hair, which first slopes forward and then swings towards the centre of dorsum, and backwards for  $\frac{3}{4}$  of its length. The spiracles are black, and just above them is a row of small, black, piliferous warts, each with a single, thin, short hair. The cremaster is prominent, of a dull red colour, edged with black, and terminates in a bunch of 8 rust-red bristles, 4 on each side, which converge and cross at their tips, forming an arch. In one specimen the two posterior segments were the same colour as the cremaster.

The length of the pupal state of these specimens was the same as that of those moths bred from mature larvæ in, and previous to, November, 1900, viz., 17 to 20 days.

## TWO NEW SPECIES OF PULVINARIA.

BY GEORGE B. KING, LAWRENCE, MASS.

*Pulvinaria Hunteri*, n. sp.—Old, dried and wrinkled female scales, cream-colour, more or less mottled with patches of red-brown, and the outer margin practically red-brown. Ovisac clear white, texture as in *innumabilis*, and not so large. The size of the scale, cleared and spread under cover glass, practically hemispherical, is from 6 to 7 mm. in diameter. The texture of the scale is quite thin and requires little boiling in caustic potash to make it very clear and colourless. The following measurements of antennal segments are in micromillimetres:

1	2	3	4	5	6	7	8	
40	48	64	48	20	24	20	36	} On maple.
40	40	60	52	20	20	20	36	
40	40	60	48	28	20	20	44	} On honey locust.
40	40	68	52	28	24	24	44	

Joint 3 is longest, 4 next; there is little difference in the length of 1, 2 and 8, and 5, 6 and 7 are nearly equal in length. The first joint has 3

hairs, two short and spine-like and one very long ; the second has 3, two short and one long ; the third has 1 long hair ; the fifth, 3 ; the seventh, 2 ; and the eighth, 10 ; all of medium length. Legs ordinary, with the coxa, 140 ; width coxa, 88. Femur with trochanter, 192 ; width trochanter, 60. Tibia, 160 ; width, 28. Tarsus, 80 ; width, 24. Claw, 28. Spines of the lateral clefts in threes, one very long, not stout, 88 long ; two short and small, 28 long. The large marginal spines are practically the same as those of *innumerabilis*, 36 and 40 long, but in the short, spine-like hairs of the margin they differ in being placed behind the large spines, whereas in *innumerabilis* they are in front.

*Hab.*—On maple at Kansas City, Kansas, (C. H. Swobode,) Col. auct., at Lawrence ; Kansas, on honey locust, Col. S. J. Hunter, after whom I have the pleasure of naming this species, for the good work he has done in the publication of his studies in the *Coccidæ* of Kansas.

*Pulvinaria Hunteri* is evidently a native species and very distinct from any hitherto found in America.

*Pulvinaria Ehrhorni*, n. sp.—♀ scales dark brown. Ovisac clear white, texture as in *innumerabilis*, and smaller. The shape of the scales under cover glass is practically round, although some of the smaller individuals are somewhat pyriform in shape, 4 and  $5\frac{1}{2}$  mm. in diameter. After prolonged boiling in caustic potash, the derm is strongly stained with brown ; texture tough and thick. Gland pits numerous, of two sizes. Margin spines thin, sharp and inclined to be curved at their end, those of the area at the posterior cleft longest, 44 long, while those anteriorly are only 24 long. Spines of the lateral incisions in threes, one long and stout, 68 in length ; two short and stout, 36 long. Anal plates, heart-shaped ; each plate with three small spines at tip, and three larger bristles on the outer margin. Front leg : Coxa, 120 ; femur, with trochanter, 220 ; tibia, 128 ; tarsus, 88 ; claw, 28 long. Width : Coxa, 120 ; trochanter, 64 ; tibia, 32 ; tarsus, 24 ; with one long stout bristle on the coxa, and one on the femur, with two shorter ones on the trochanter. Antennæ, 8-jointed : 3 longest, 4 and 5 next, and in some individuals nearly equal ; 1 is next, then 8, 6 and 7 are shortest and nearly equal. The first joint has one long and one short hair ; the second, two long ; the third, one ; the fifth, two ; the sixth, one ; the seventh, two ; and the eighth, nine ;

these all stout, with one very long. The measurements of the several joints are as follows :

Joint—1	2	3	4	5	6	7	8
52	48	92	60	60-48	28	28	40
52	40	80	56	52	24	24	40
48	40	80	52	60	36	32	44

The approximate formula will be 345128(67). There are a number of long, thin hairs between the antennæ, very variable in length, 136, 80, 56 and 40. There are also some short, spine-like hairs.

*Hab.*—At Mountain View, California, on alder and willow ; found May 3rd, 1899, by Mr. Edw. H. Ehrhorn. It is a very distinct species and can be separated easily from its nearest American ally, *Pulvinaria occidentalis*, by the antennæ. I take pleasure in naming this insect after Mr. Ehrhorn, in recognition of the fact of his good work done in the discovery and technical study of the Coccids of California. So far as known at the present time, this makes the fifteenth species native to the United States ; and *P. Hunteri* is the fourth species found to infest maple.

I take this opportunity to record the finding of *Dactylopius Kingii*, var. *Neo-Mexicana*, Tinsley, in nests of *Lasius Americanus*, Em., at East Las Vegas, New Mexico, by Prof. Cockerell, and also *Ripersia flaveola*, Ckll., at Gullinas Canon, New Mexico, by Prof. Cockerell and Mrs. Wilmatte Cockerell, under a log in the transition zone, altitude about 7,500 feet. The same species was found by Mrs. E. L. Hewett and Mr. Cockerell at East Las Vegas, N. M., in the nest of *Lasius*, sp. Hitherto this species was only known from Massachusetts, from ants' nests.—G.B.K.

#### TYPES AND SYNONYMY.

BY JOHN B. SMITH, SC. D., RUTGERS COLLEGE, N. J.

Two papers in the last (April) number of the CANADIAN ENTOMOLOGIST are of great interest to me, and both on the same general topic applied to very different species. Mr. Lyman makes an earnest effort to save Mr. Walker's name *Spilosoma congrua*, and gives all the facts relating to the name, its publication and subsequent history ; upon which facts Mr. Lyman and Sir George Hampson reach opposite conclusions. I have no liking for Mr. Walker's species, but I think I would side with Mr.

Lyman in this case, because, with all the examples before them, Messrs. Grote and Robinson separated out a good species with which a specimen of another, previously known, was erroneously associated. By removing one example, a good species remained, to which the name given by the author could be correctly applied.

All of us are apt to err in associating examples, and I have always made it a rule to hold a name if I can do it. So I think Mr. Lyman correct in this case on his statement of facts, though I had reached a different conclusion from a somewhat different combination of real and supposed facts.

On page 122, Dr. Harrison G. Dyar, Washington, D. C., assistant in charge of the Lepidoptera in the U. S. National Museum, has some remarks on certain species of *Acronycta* which are suggestive indeed.

First, he accepts my identification of *impleta* with *luteicoma* in so grudging a spirit that he suggests destroying the type—of *impleta*, I presume—"lest future changes in the synonymy result." It is to be assumed that Dr. Dyar wishes to be taken seriously, and in view of the fact that there are several hundred types in his charge, the suggestion is unpleasant reading. It is a somewhat startling method of securing stability of nomenclature!

Without disputing the facts as I stated them, that the type of *brumosa*, Gn., directly compared with that of *persuasa*, Harv., proves them to be identical, he yet proposes to retain *persuasa*, Harv., but to apply the name *brumosa* to what we have heretofore considered *hamamelis*. In other words, he desires to apply the name to a totally different species from that which was in the hands of its describer. That Guenée mixed up matters in attempting to associate Abbott's drawings of larvæ with the imagoes, is undoubtedly true, but it was the moth that was described and named, not the larva.

I am perfectly aware that a species is entirely represented only by all its stages and both sexes of the adults; but it is nevertheless true that it is the adult form that receives the name, and when we have the adult to which the name is applied, we have assumed that we had the court of ultimate resort by which the validity of the species must be tested. If we could set that adult aside because the description does not quite fit it, or because of an error in associating an earlier stage with the type, we might just as well abandon the effort to fix a type. And why should the U. S. National Museum desire types under such circumstances? If

its official representative refuses to recognize the application of type labels to the specimens with which they are associated in the British Museum, why should anyone else give greater credit to similar labels in the U. S. National Museum?

Dr. Dyar is not even consistent: it rather suits him to restore the term *clarescens* to the form which Mr. Grote originally and correctly so identified, though the description applies so much better to *haesitata* that I felt myself entirely safe in following Mr. Butler's reference of the name to the latter species. But because *hamamelis*, as applied to the form afterwards named *afflicta* by Mr. Grote, does not agree with his preferences, he suggests its application to what Mr. Grote named *subochrea*, because the description better suits that form.

The question narrows itself to this: Which is the court of final resort, the type specimen which the author named and intended to describe, or the description which, if it does not apply to the specimen it was made for, may apply to nothing at all?

In reference to the *var. b* of *brumosa*, Dr. Dyar is correct in saying it is not described; but Guenée evidently received additional information and perhaps specimens after writing the original description, for he refers again to the species on p. 390 of the 3rd volume of the *Noctuelites*, without adding to or changing the characterization of the adult.

Mr. Walker is not particularly good authority, but it is an indication at least that he suggested *brumosa* and *hamamelis* as sexes of one species; and Mr. Walker was not famous as a lumpner either. Assuming my suggestions as to synonymy to be correct, Walker's remark is not so far out, especially when that *var. "b"* is considered; but assuming Dr. Dyar to be correct, the suggestion becomes ridiculous, because Walker, ever on the lookout for differences, simply could not have considered *hamamelis*, Auct. (not Gn.), as the same as *subochrea*. The bare fact is that the specimen which in the British Museum is marked as the type of *hamamelis*, Gn., is that form which Mr. Grote afterward called *afflicta*, and that the form to which Dr. Dyar now wishes to apply the name *brumosa* was apparently not in Guenée's hands at all!

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The twentieth annual meeting of the Royal Society of Canada will be held at Ottawa, beginning on Tuesday, May 21st, under the Presidency of Mr. Louis Frechette, C. M. G., LL. D.

THE AMERICAN BEES OF THE GENUS *ANDRENA* DESCRIBED BY F. SMITH.

BY REV. F. D. MORICE AND T. D. A. COCKERELL.

(Continued from page 124.)

*Andrena fragilis*, Smith, 1853.

"This I suspect is the ♂ of *integra*; area similarly strigose, and abdomen also corresponds; tubercle matches also!"

Robertson thought this might be *A. platyparia*: but, he said, the description applied even better to *salicis*, and nearly as well to *mandibularis*. It cannot well be *salicis*, as that has the abdomen impunctate; if it is the ♂ of *integra*, it cannot well be *mandibularis*; it may perhaps be *platyparia*.

*Andrena frigida*, Smith, 1853.

"(Very near *apicata*, but hairs of thorax much darker) ? = *lapponica*; antennæ with very long third joint; tubercle ♂; area granulated; abdomen in style of *apicata*."

Type locality, Nova Scotia. I do not know any similar species.

*Andrena fimbriata*, Smith, 1853 (*Americana*, D. T.).

"♂ abdomen rugulose and punctured, clothed with long adpressed hairs; tubercle slightly emarginate (?); area dull granulose; ♀ ditto. (Very near *fuscipes*, perhaps identical with it.)" This agrees with what I had already identified from Smith's description. It seems to agree with the description of *A. simillima*, Sm., even better than with that of *fuscipes*, but I doubt its actual identity with either.

*Andrena hirticeps*, Smith, 1853.

- ♂. "Tubercle pointed apparently, hard to see under thick bush of hair on clypeus; area obliquely rugose at base only, no raised margin; abdomen tessellate, practically impunctate; apical ventral valve somewhat bilobed; antennæ with article 3 = 4 + 5 about, all joints pretty long. Has a good deal the aspect of *gwynana*." This was considered the ♂ of *A. vicina*, but Robertson (1900) has come to regard it as a valid species. He further adds: "But for the description of the ♂, I would say that *A. errans* is the same as *A. hirticeps*." I have an Illinois "*hirticeps*," ♂, from Mr. Robertson, and the abdomen is distinctly punctate at the bases of the hairs, while the third antennal joint is barely longer than the fifth, the fourth being a little shorter than either. The apical ventral

valve also is not bilobed. In the female of Robertson's "*hirticeps*," the basal process of labrum is low, broad and rounded (semi-circular, Robertson expresses it), which does not agree with *vicina* or *errans*. Robertson's insect will therefore need a new name, as follows:

*Andrena Carlini*, n. n., Ckll.

*Andrena bicolor* (not of Fab.), Rob., Tr. Am. Ent. Soc., XVIII., 51.

*Andrena vicina* (not of Sm.), Rob., Tr. Am. Ent. Soc., XXII., 118.

*Andrena hirticeps* (not of Sm.), Rob., Trans. Acad. Sci., St. Louis, X., 47.

The true *A. hirticeps* is a northern species, from Hudson's Bay.

*A. Carlini* is from Illinois; type locality, Carlinville. It also occurs in Kansas, N. Y. and N. M. (see below).

*Andrena algida*, Smith, 1853.

- ♂. "Tubercle truncate; apical ventral valve 0; antennal joint 3 about = 5, slightly longer than 4; area (longitudinally) somewhat rugose; abdomen tessellate and also delicately punctured." Type locality, Hudson's Bay. The ♂ is rather suggestive of *Carlini*, except as to the tubercle.

The ♀ described by Smith is not at all like *Carlini*.

*Andrena nubecula*, Smith, 1853.

- ♀. "Tubercle emarginate; area shortly rugose at base; abdomen tessellated, impunctate; a pretty insect, with broad white bands and pale reddish-yellow apex; antennal article 3 scarcely = 4 + 5 (cf. *proxima* or *dorsata*)." "Wings remarkably clouded."

I have this from Lincoln, Nebraska, collected in August and September, sent by Prof. L. Bruner (No. 12). Smith's description of the abdomen is inaccurate as regards the punctuation.

*Andrena obscuripennis*, Smith, 1853.


- ♀. "Tubercle convexly truncate; abdomen closely punctured; area bordered with raised ridge, rugose but not very largely so, and laterally only granulated; wings beautiful violet; pilosity rich red (large grand species)." Type locality, Georgia. This has some resemblance to *A. Hallii*, but is quite distinct.

*Andrena perplexa*, Smith, 1853.

- ♀. "Tubercle truncate; area seems nearly smooth, but dull, with fine close tessellations; abdominal segments smooth and closely punctured, except towards their apices, which are rugulose." Type

locality, Georgia. This is evidently different from any species I have seen.

*Andrena nivalis*, Smith, 1853.

- ♀. "Tubercle ; antennal joint 3 longer than 4 + 5; area rugose at base; abdomen distinctly punctured, but on an aciculated surface." Type locality, Hudson's Bay. This is very near to *A. semirufa*, Ckll., from New Mexico; possibly it is the same species.

*Andrena hilaris*, Smith, 1853.

- ♀. "Tubercle of labrum wide, truncate, below its centre a projecting pencil of golden hairs; clypeus coarsely punctured, with a smooth shining carina down its middle; metathoracic area finely rugulose, with some coarse short longitudinal strigæ at its base; abdomen distinctly punctured, its surface also microscopically (hardly visibly) rugulose; wings very yellow." Type locality, Georgia. Evidently distinct from anything I have before me.


*Andrena vicina*, Smith, 1853.

- ♀. Length "about 14 mill.; tubercle wide, truncate; clypeus with wide unpunctured central elevation; area dull rugulose; abdomen finely rugulose all over, and distinctly but shallowly punctured." Smith gives the length as only 5 lines, and says the species closely resembles *A. nitida*. I hardly know what to make of this; the species referred to *vicina* in American collections has the tubercle low and rounded, by no means truncate; also, it does not have the very shiny, oval abdomen of *nitida*, which species, it may be remarked, has the tubercle concavely truncate. *A. vicina* is said to be from the United States and Nova Scotia.

*Andrena placida*, Smith, 1853.

- ♀. "Tubercle very narrowly truncated; area rather coarsely rugulose, but not margined, I think; abdomen rugulose, a few sparse punctures; length about 12 mill., much smaller and narrower insect than *vicina*—looks like a *parviceps*." From "U. S." Smith gives the size the same as that of *vicina*, but this must be a mistake. *A. placida* seems to come close to *A. Macgillivrayi*.

*Andrena fastuosa*, Smith, 1879.

- ♀. "Tubercle , difficult to say if actually emarginate; area and abdomen as ♂."
- ♂. "Tubercle emarginate; huge stipites! area rugose, unmargined; abdomen closely punctured." From Orizaba, Mexico. *Andrena*




*argemonis*, Ckll., from New Mexico, is possibly not separable from *fastuosa*.


*Andrena discreta*, Smith, 1879.

- ♀. "Coloured like a big bright *cetii*; tubercle emarginate; area finely rugose, unmarginated; abdominal segments densely clothed above with fulvous hairs, except the basal which is naked." Oajaca, Mexico. When describing *A. jessicæ* I suggested that it might possibly be the ♂ of *discreta*, but it is now evident that this cannot be.

*Andrena sodalis*, Smith, 1879.

- "Tubercle ; abdomen shining, though rugulose, and also very delicately punctured; area not margined nor rugose." Oajaca, Mexico.

*Andrena simulata*, Smith, 1879.

- "Labrum almost pointed , I see no definite tubercle; abdomen smooth, very shining, shallowly punctured; area without ridge, rugosities slight, longitudinal at base." Orizaba, Mexico.


*Andrena agilis*, Smith, 1879.

- ♂. "Labrum looks truncate, I can't see tubercle; clypeus not all white, but marked with yellow like a ♀ *Ceratina*; abdomen finely punctured; area rugulose, not clearly defined at sides; central impression deep?" Oajaca, Mexico.

*Andrena modesta*, Smith, 1879.

- ♀. "Sides of propodeum fringed with short white hairs; area rugulose, not margined; abdomen finely punctured; no tubercle to be seen." Oajaca, Mexico.


*Andrena commoda*, Smith, 1879.

- ♀. "Tubercle pointed ; area not margined, fine basal strigæ; abdomen punctured, also aciculate, dull." This nearly agrees with *A. pruni*, Rob., but the tubercle of that species is not at all pointed. *A. commoda* is from Canada.

*Andrena flavoclypeata*, Smith, 1879.

- ♂. "Clypeus has a *third* black spot in middle of apex; tubercle hard to see through hairs, I think a little emarginate; area not ridged; abdomen tessellated, scarcely punctured." Locality, Canada. This is regarded as a synonym of *A. bipunctata*, Cresson, and is well known. The third black spot is not always present.

*Andrena miranda*, Smith, 1879.

- ♂ ♀. "Clypeus ; area coarsely clathrate and margined; abdomen strongly punctured." Canada. Related to *A. Forbesii*, but not the same.

*Andrena mæsta*, Smith, 1879.

- "Area scarcely rugulose, not margined; abdomen scarcely punctured (*lapponica* style); tubercle slightly emarginate or bilobed. Canada. This species appears to differ from any known to me.

*Andrena errans*, Smith, 1879.

- "Area not margined, smooth nearly; abdomen with shallow punctures; tubercle pointed (one ♀ has the discs of abdominal segments densely clothed with black upright hairs, probably a different species)." Vancouver I. This is not the north-western species which I have regarded as *errans*; the female with hairy abdomen may be *pluvialis*.

A close study shows that there are several species confused with *vicina* or *errans* in American collections. These (♀) all agree in being about 13 or 14 mm. long; the thorax densely clothed with upright rather short hair (bright ferruginous in *Hallii*, pale ochraceous in the rest); the abdomen shining black, without hair-bands; the anal fimbria black; the wings decidedly brownish. The species of this series now before me are:

- A. Carlini*, Ckll.: Tubercle of labrum broad and evenly rounded; clypeus with a median impunctate ridge; hair of face mixed pale and black, of pleura black; basal area of metathorax roughened, not plicate; abdomen tessellate and well punctured; antennal joint 3 rather shorter than in *Hallii*. Illinois; Beulah, N. M., May 30 (*W. Porter*); Baldwin, Kansas, May (*J. C. Bridwell*); Ithaca, N. Y., May 17 (*Macgillivray*). Seven specimens examined.
- A. Hallii*, Dunning: Tubercle of labrum broad but truncate; median line of clypeus impunctate, but minutely tessellate; hair of face and pleura black; basal area of metathorax obliquely plicate at base; abdomen tessellate, with numerous small punctures. Pullman, Wash. (*C. V. Piper*).
- A. cupreotincta*, Ckll., n. sp.: Tubercle with sloping sides and truncate apex; clypeus without a median impunctate ridge, or it is very short and rudimentary; hair of face, cheeks, occiput and

pleura black; basal area of metathorax strongly longitudinally plicate, its sculpture entirely different from that of the adjacent lateral areas, though it has no raised margin; abdomen well punctured on a smooth surface, the punctures very strong and close at the sides of the segments; hair on inner sides of basal joints of tarsi tinged with coppery. Skokomish River, Wash., April 26, 1892 (*Trevor Kincaid*).

*A. pluvialis*, Ckll., n. sp.: Tubercle with sloping sides and truncate apex; clypeus without any impunctate line; hair of face black, a little pale at sides, of vertex and cheeks black, of occiput pale, of pleura black; area roughened, not plicate, longer than in *cupreotincta*, and so larger, larger than in *Carlini* because broader behind, its posterior angle greater; abdomen with a sericeous lustre, the punctures small; surface of abdomen quite hairy, the hairs black. Olympia, Wash., May 1, 1894 (*Trevor Kincaid*).

*A. anogra*, Ckll., n. sp.: Agrees with *pluvialis*, except that pubescence of thoracic dorsum is brighter, more fulvous; hair of face is wholly black; tubercle is small and emarginate or binodulose at apex; area is more coarsely rugulose and much narrower behind, being shaped as in *Carlini*. Colorado Springs, Colo., middle of July, at flowers of a white *Oenothera* (Ckll., 3567).

*A. vicina*, Smith: Tubercle broad and truncate, the truncation sometimes concave and distinct, sometimes rather obscure; clypeus with a median impunctate ridge, which is more or less roughened; hair of face pale, black only round the mouth, or only below the mouth; hair of cheeks, vertex, occiput and pleura pale, area roughened, large, not narrower behind, shaped as in *pluvialis*, but the sides of the metathorax are clothed with pale hair, whereas in *pluvialis* it is black; abdomen tessellate and well punctured, hardly hairy except apically, being much less hairy than in *pluvialis*; hair on first segment pale. Olympia, Wash., June 4, 1895 (*Trevor Kincaid*); Michigan (*C. F. Baker*, labeled *A. bicolor*); Hartford, Ct., May 30, 1894, and May 31st, 1896 (*S. N. Dunning*). This is evidently the true *vicina* of Smith; it ranges further north than *Carlini*.

*Andrena cærulea*, Smith, 1879.

"Area smooth, not margined; abdomen rugulose with slight raised points; tubercle I think slightly emarginate." Vancouver I. *A.*

*cærulea*, var. *terrata*, Ckll., Entom., 1898, p. 89, is perhaps a distinct species; in the description, line 15 from top of page, tinge is misprinted "fringe." *A. nigrocærulea*, from the same region, has the tubercle concavely truncate, one might say slightly emarginate, but it is otherwise different from *cærulea*.

*Andrena subtilis*, Smith, 1879.

"Tubercle  $\wedge$ ; abdomen tessellated, hardly punctured; area smooth, not ridged laterally." Vancouver I. I do not know this species.

*Andrena candida*, Smith, 1879.

"Abdomen dull green, scarcely punctured; area with rugosities slight, no ridge; labrum ? a little emarginate." Vancouver I.; Olympia, Wash., June 18, 1895 (*Trevor Kincaid*). In Mr. Kincaid's specimen the hair at apex of abdomen is blackish, but the species is doubtless the same. *A. geranii*, Rob., is closely allied.

*Andrena auricoma*, Smith, 1879.

"Can't see labrum; a pretty insect with fulvous upright pilosity on discs of segments and golden fasciæ at the apices; area granulose, not margined." Vancouver I. Unknown to me.

#### BOOK NOTICE.

REPORT OF INJURIOUS INSECTS and Common Farm Pests during the year 1900, with Methods of Prevention and Remedy. By Eleanor A. Ormerod, L.L.D. London: Simpkin, Marshall & Co., 1901 (1s. 6d.; pp. 111).

It is with deep regret that we learn from the preface of this her twenty-fourth annual report that the talented authoress has decided that it shall be the last. For almost a quarter of a century Miss Ormerod has labored hard and well in the service of her country, without any remuneration and with scanty recognition from the officials who should have been the first to express their gratitude to her. But, on the other hand, she has won for herself a high reputation in Great Britain, in America, in South Africa and Australia, and also in several European countries. She is known far and wide as a painstaking entomologist, a keen observer, a diligent collector of facts and observations, a thoroughly practical and sensible adviser, and one who has been all through these years most unselfish in placing her time and her work at the disposal of those who needed them most—the farmers and gardeners of her native land.

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The present Report, the second of the new series, is on the same plan as its predecessor. It deals at some length with twenty species of injurious insects affecting the apple, pear and plum, currant and raspberry, potatoes, beans, wheat and mustard, ash trees and sheep's nostrils—a varied list, indeed. There is also an account of the curious flatworm (*Bipalium Kewense*) which feeds upon earthworms, and of the fungous disease which produces what are known as "bladder plums." The volume closes with short notices of some insects that have often been referred to before in these Reports—the apple Psylla, gooseberry Sawfly, cabbage Moth attacking peas, and the pine-shoot Tortrix. The various papers are illustrated with about thirty excellent wood-cuts.

We grieve to say "good bye" in this way to our venerated friend, whom we have known and esteemed for so many years. We earnestly hope that her days on earth may be prolonged, that she may enjoy a rest that she has assuredly earned, and that she may still continue her interest in Economic Entomology and give the help of her knowledge and experience when from time to time it may be sorely needed.

C. J. S. B.

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